National Character Area profile:

77. North Norfolk Coast

Supporting documents

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Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper[1], Biodiversity 2020[2] and the European Landscape Convention[3], we are revising profiles for England's 159 National Character Areas (NCAs). These are areas that share similar landscape characteristics, and which follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.

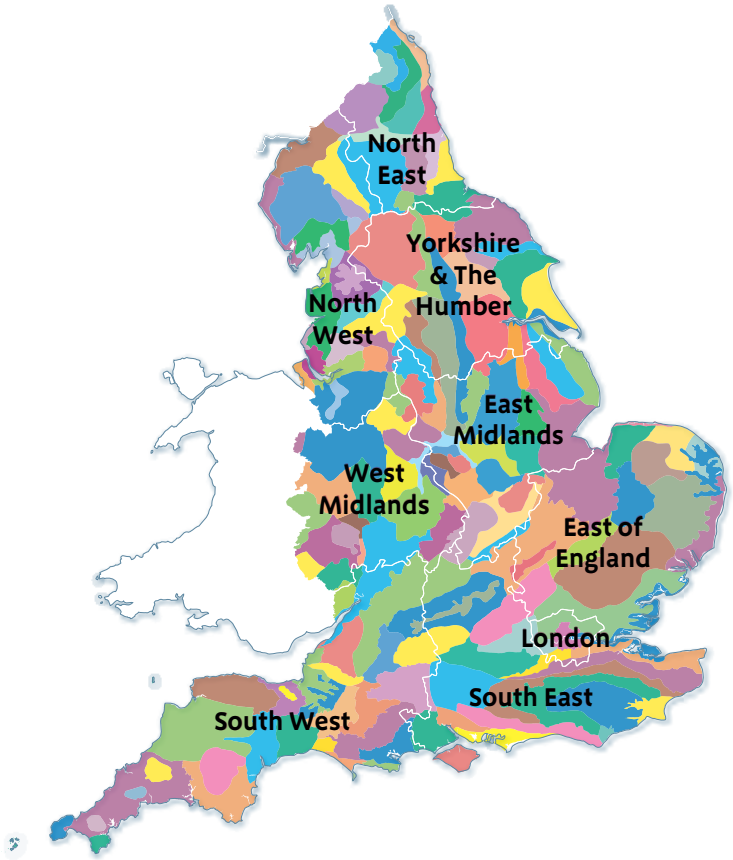
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage broader partnership working through Local Nature Partnerships. The profiles will also help to inform choices about how land is managed and can change.

Each profile includes a description of the natural and cultural features that shape our landscapes, how the landscape has changed over time, the current key drivers for ongoing change, and a broad analysis of each area's characteristics and ecosystem services. Statements of Environmental Opportunity (SEOs) are suggested, which draw on this integrated information. The SEOs offer guidance on the critical issues, which could help to achieve sustainable growth and a more secure environmental future.

NCA profiles are working documents which draw on current evidence and knowledge. We will aim to refresh and update them periodically as new information becomes available to us.

We would like to hear how useful the NCA profiles are to you. You can contact the NCA team by emailing **ncaprofiles@naturalengland.org.uk**

National Character Areas map



[1] The Natural Choice: Securing the Value of Nature, Defra (2011; URL: **www.official-documents.gov.uk/document/cm80/8082/8082.pdf**)

[2] Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: **www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf**)

[3] European Landscape Convention, Council of Europe (2000; **URL: http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm**)

Summary

The flat, low-lying, open and remote coastal plain dominates the North Norfolk Coast landscape. The muted, changing colours of the salt marsh and the marram grass amid the sand dunes and the shallow channels of glistening mudflats, tidal flats, shingle banks and sea defence banks provide a variety of texture and detail, behind which the sea meets the sky providing long, sweeping views out to sea where recently installed wind turbines can be seen up to wide open skies. From the coastal plain the land becomes gradually more undulating as it rises up towards the coastal road and the higher ground behind. On the eastern part of the coast, from Weybourne, soft cliffs of glacial and pre-glacial material deposited on chalk extend towards Sheringham and form a prominent feature. This is a dynamic coast, comprising habitats of coastal salt marsh, coastal sand dunes, intertidal mudflats and sand flats, coastal vegetated shingle, reedbeds, saline lagoons and coastal and flood plain grazing marsh which are shaped by the coastal processes that act upon them and by human intervention: management and development, which both shape these fragile habitats. The profusion of marine and bird life and abundance of flora which these habitats support, such as grey and common seals, marine invertebrates, seagrass, little tern, Sandwich tern, common scoter, Brent and pink-footed geese, sea lavender, sea wormwood and rare natterjack toad provides an extraordinary environment and makes the area a special place for locals and visitors alike.

Apart from the settlements, which are clustered along the narrow coastal road, there is a lack of development and a strong sense of tranquillity outside the extended tourist season. Tourism is the major industry in the area, supplemented by farming and fishing and, more recently, the establishment of an offshore wind energy hub utilising the port of Wells. The coastal marshes grade into gently rolling countryside which is primarily used for arable agriculture. The area grows spring barley on the light coastal soils, and mussels and samphire are seasonal delicacies.

Almost the whole area is a Special Area of Conservation under the Habitats Directive, a Special Protection Area under the Birds Directive and a Ramsar site, and there are eight Sites of Special Scientific Interest (SSSI). Much of the coastline is owned or managed by conservation organisations, with the majority of sites being National Nature Reserves. The reserves provide recreational access for people and offer educational and volunteer opportunities. These sites comprise specialised plant species of shingle, salt marsh and dunes, colonies of terns, wintering waders and wildfowl, and common seals. The exceptional beauty, tranquillity and wildness of the coast are reflected in its designation as an Area of Outstanding Natural Beauty and definition as a Heritage Coast. The geomorphology of the entire coastline is one of the most outstanding assemblages of coastal forms in Britain and is important internationally, with six SSSI designated for their geological value; they are also rich in evidence for human habitation and adaption of the landscape from the prehistoric period.

Click map to enlarge; click again to reduce.

The geomorphology of the entire coastline is one of the most outstanding assemblages of coastal forms in Britain.

The area is very popular as a visitor destination, providing many leisure and recreational opportunities, with associated health benefits. This is further enhanced by the area's historic maritime and military past. Traditional activities, including those of common rights, are also practised and are an important aspect of the local culture and economy. The Norfolk Coast Path National Trail provides important access for all to a remote and wild coastline with spectacular sea views.

The greatest challenge facing the area comes from climate change[4]. The National Character Area (NCA) is likely to become increasingly vulnerable to tidal surges from sea level rise and increased storminess. Rainfall, on the other hand, is low and there is susceptibility to drought which could increase abstraction rates, lowering the water table and drying out rare habitats that support invertebrates, and have an effect on water supplies for local residents and visitors and the ability of the area to grow food. As summers get hotter it is predicted that substantially more people will visit the beaches along the coast increasing the NCA's popularity as a tourism and recreation destination. This is likely to lead to further traffic congestion issues and localised development pressures including purchase of second homes but it could also generate economic activity. Conflict with the management of fragile habitats and species which can be easily disturbed by recreational activity will need to be carefully managed. To overcome these challenges further collaboration between stakeholders and local people may be needed with the aim of a more holistic management for the whole NCA.

[4] *Implications of Climate Change for Coastal and Inter-tidal Habitats in the UK*, HL Mossman, A Grant and AJ Davy (2013; URL: www.lwec.org.uk/publications/10-implications-climate-change-coastal-and-inter-tidal-habitats-uk)

Statements of Environmental Opportunity

- **SEO 1**: Conserve and enhance this dynamic, remote and inspiring coastal landscape with its internationally important interrelated habitats of shingle, sand dunes, salt marsh, reedbeds, lagoons and mudflats, while allowing for the dynamic coastal processes that are essential to the character of this area, managing coastal squeeze, and addressing the implications of sea level rise resulting from climate change.

- **SEO 2**: Plan for and sustainably manage high visitor numbers to the North Norfolk Coast, particularly access to the sea and the National Nature Reserves, while recognising common rights and maintaining a living working landscape, reducing congestion on the rural roads and protecting the tranquillity and beauty which are valued by visitors and local residents.

- **SEO 3**: Conserve, manage and increase understanding of an area which is rich in archaeological, historical and cultural heritage, offers wildness and inspiration, wide open views, beauty, a rich mosaic of wildlife habitats and seascapes of international importance, and is a cherished place to live and to visit.

- **SEO 4**: Seek to maintain and enhance the distinctive and internationally important intertidal habitat and inshore waters which provide examples of rare geodiversity, estuarine habitat and species and important cultural, historic and economic resources which are valued by local communities.

The narrow coastal road is a vital transport route for all road users but is very busy during the summer months and at weekends.

Description

Physical and functional links to other National Character Areas

The North Norfolk Coast National Character Area (NCA) occupies a narrow strip between the arable land of the North West Norfolk NCA and Central North Norfolk NCA to the south, and the shallow coastal waters of the North Sea and the Wash. The long boundary with the coast directly contributes to the dynamic nature of this constantly changing landscape. The NCA occupies a very narrow band of land from the south-eastern edge of the Wash which lies in The Fens NCA as far east as the outskirts of Sheringham. The southern boundary, which is marked by the A149 coastal road and its settlements, links the seaside resort towns of Hunstanton in the west and Sheringham in the east. Settlements, some of which are in the North West Norfolk NCA, have developed here because of their relationship with the North Norfolk Coast NCA and the ecosystems that it provides.

Cliffs between Weybourne and Sheringham contrast with the low-lying nature of the rest of the NCA, and consist of glacial deposits which lie on a chalk bedrock and are notably visible from the beach at Weybourne. These cliffs are also highly visible from within the NCA and from the sea, and provide a landward backdrop to the beach between Weybourne and Sheringham. The cliffs erode as a result of slumping, wave action and rainfall which mixes with eroded sediment moving westward from Sheringham, providing material for the beaches, deposited at places such as the sand dunes at Holkham and the spit at Blakeney Point and continuing on to the Wash, with additional sediment coming from the sea floor and from northern coastal NCAs. This sediment transfer system is one of the most significant in the UK marine environment.

The remote, low-lying barrier coastline offers long, unrestricted, panoramic views out to sea and huge skies, with extensive views over the open marshes which link the land and sea. To the south there are views to the scattered settlements and the hedgerow-lined fields. In contrast, the cliffs at Weybourne allow views along the coast from east to west and to the higher ground to the south. The coast road provides an elevated viewpoint from which to view the NCA in its entirety, from arable fields and smallholdings to gentrified buildings, small harbours and fishing boats, and landmark churches and windmills.

The rivers Hun, Burn, Stiffkey and Glaven which flow through this NCA to the North Sea have their source in NCAs to the south. Formerly important navigation routes, they now provide passages for fish and aid species mobility, although this is restricted by sluices. The rivers also provide nutrients for the marshes linking the coastal and river habitats. Groundwater from chalk and sands in adjoining NCAs supplies springs in the NCA which underpin the ecological diversity of the marshes and maintain the supply of freshwater for key habitats. The area is closely linked to the marine environment and much of the NCA is inundated by the sea on spring tides.

The narrow A149 coast road provides the main access route to the NCA for visitors living outside the area. Two tourist railways, one linked to mainline rail services, offer an alternative way to access the coast. The Norfolk Coast Path runs along the length of the NCA and links to Sustrans Regional Cycle Route 30 providing alternative access for walkers, cyclists and horse riders and links to the Peddars Way in the west.

Distinct areas

Coastal cliffs from Weybourne to Sheringham.

Key characteristics

- A predominantly open, flat and dynamic coastal landscape strongly influenced by North Sea marine sediments, much of it frequently inundated by spring tides owing to its low-lying nature.
- Scolt Head and Blakeney Point sand banks, where dune and salt marsh vegetation has formed, are coastal storm barriers and an integral part of the sediment transfer system of this dynamic landscape. They are habitats for internationally and nationally important birds, plants and marine life
- The rivers Glaven, Stiffkey and Burn are fast-flowing, ecologically rich chalk streams that, along with springs from the underlying chalk, provide freshwater for the internationally important coastal habitats.
- Agricultural use of the land in the NCA is restricted by the topography and proximity to the sea. Arable land with moderately fertile loamy and clayey soils is found on more elevated areas. On the coastal plain reclaimed freshwater grazing marshes fringed by reedbeds, commonly cut for thatching, are key features.
- Rich and abundant variety of internationally important marine and coastal habitats and species, including intertidal mudflats, sand dunes and wide sandy beaches, shingle banks, salt marsh, reedbeds, tidal creeks and harbours.
- Overall sense of wildness, remoteness and tranquillity with general lack of development provides for long, sweeping views in all directions.
- Unwooded character overall with very limited tree cover, apart from pine plantations at Holme and Holkham, which are distinctive and visible features.
- Highly distinctive traditional architecture and use of materials which make use of flint and carr stone, unified by the use of red brick. These buildings are clustered in the villages, which are linked by the A149 coast road, but they are also found in a scatter of isolated farmsteads and houses.
- A rich archaeological heritage and historic environment provide evidence of a maritime and defensive military past as well as the presence of Palaeolithic/stone-age ancestors.
- The Norfolk Coast Path National Trail runs through the NCA with links to the Peddars Way in the western extent of the area.

North Norfolk Coast today

The North Norfolk Coast is an area of enormous variety, from the mudflats and salt marshes around Blakeney to the shingle banks of Cley–Salthouse and the extensive sandy beach and dunes at Holkham. Erosion and deposition are features of this coast. The strata that once formed cliffs along the length of the coast, now confined to the outer limits of the area, are nearly all of soft or loosely aggregated glacial sands, gravels and clays. Most of this coast is dependent on sea and wave action for its form and structure. In front of the sea defences there is a constantly shifting, dynamic landscape. Behind the shingle spits of Blakeney Point and Scolt, which are of national and European geological interest and special importance, and form part of a discontinuous series of beach barriers fronting marsh areas, sand banks have formed where salt marsh vegetation can become established. A complex barrier dune system protects these remote and varied tracts of salt marsh which, together with shallow seas and large areas of intertidal mud and sand, support large populations of invertebrates and molluscs. These in turn support internationally important bird populations at various times throughout the year including large numbers of wildfowl and waders, marsh harrier, avocet, Sandwich tern, common tern and little tern, one of Britain's rarest breeding seabirds.

On the more exposed intertidal sands and mudflats vegetation is transient. Behind the dunes extensive areas have been drained to create freshwater grazing marshes, reedbeds and some arable land. It has an openness and flatness with marshes that extend to the horizon; the salt marshes are among the most extensive in Europe and are of extremely high historic, geomorphological and ecological value. The intertidal areas are naturally dynamic whereas the reclaimed areas are relatively stable. The beaches of the Norfolk Coast form one of the outstanding undeveloped assemblages of coastal landforms in Britain. It is home to more common seals than anywhere else in England apart from the adjacent Wash. The landscape is highly sensitive and has reached a critical point in its development.

The North Norfolk Coast is designated as part of the Norfolk Coast Area of Outstanding Natural Beauty (AONB) and North Norfolk Heritage Coast; a Ramsar site for its diverse and extensive wetland habitats and associated species, notably waterfowl; a Special Protection Area as for waterfowl and large populations of breeding waterbirds, particularly tern and pink-footed goose; a Special Area of Conservation for coastal lagoons, coastal dunes and stony banks; and a Marine Special Area of Conservation for sandbanks, sediment communities, Atlantic salt meadows and Mediterranean salt marsh scrubs. There are four National Nature Reserves, two nature reserves and eight Sites of Special Scientific Interest in the NCA, which are protected and managed for their geological and wildlife interest.

Four rivers flow into the area. The River Hun runs through the land behind Holme dunes and outfalls into Thornham Harbour channel. Its course is mainly artificial, straightened and deepened with the reclamation of Holme Marsh. The rivers Burn, Stiffkey and Glaven follow more natural courses, discharging freshwater into salt marshes in the intertidal area. Groundwater provides base flow to these rivers which helps to support important wetland habitat.

The NCA has an unwooded character except for prominent pine trees seen on the dunes at Holkham and Holme. Small parts of the area are managed for arable and pasture with fields defined by hedgerows and occasional hedgerow trees. Along the base of the coastal slope near the coast road a generally intact, coherent network of hedgerows defines the landscape pattern. There are occasional mature trees, hedgerows and high-quality buildings in the gaps of open countryside between the linear villages.

Bait digging along with wildfowling and samphire gathering is a particularly important part of the local culture and economy.

Agricultural land use has been restricted by topography and proximity to the sea. There are areas of arable and pasture on the coastal plain, but much of the arable land is confined to a narrow band between the coastal marshes and the A149. East of Weybourne, arable cultivation on fertile soil takes place almost to the cliff edge.

The area is sparsely populated with Wells-next-the-Sea the only town and remaining operational port. There is a scattering of attractive coastal villages along the coast road, some with small staithes or harbours, which still support small fishing communities but are now mainly tourist destinations. They were once thriving ports of strategic importance such as Holme, Titchwell, the Burnhams and Blakeney, with their churches, windmills, staithes, harbours with numerous small boats, and houses built from flint and brick. Siltation has been their downfall as these harbours are now some distance from the sea. Brick is a consistent feature in an otherwise highly varied mix of traditional building materials: ginger-coloured carstone and flint from the Chalk, usually with pantiled roofs, with carstone more common near its source in the west. This gingery-brown material is distinctive, giving warmth of colour and roughness of texture to villages of flint and brick. Settlements such as Burnham Overy, Wells and Cley are strung out following land high enough to be safe from the sea. The harbour at Wells with its overhead gantries is always bustling, and this has increased as new industries have been created as a result of offshore turbines which are a notable addition to the seascape all along the NCA. Cley windmill and Blakeney and Salthouse churches, among others, stand in silhouette against the open coastal sky.

The landscape's natural beauty and resources encourage many recreational activities and attract visitors all year round. Bird reserves at Blakeney, Titchwell and Cley are a focus for birdwatching, and increasingly as a leisure destination. Traditional activities, including numerous common rights such as samphire gathering, bait digging and wildfowling, are widely recognised as a particularly

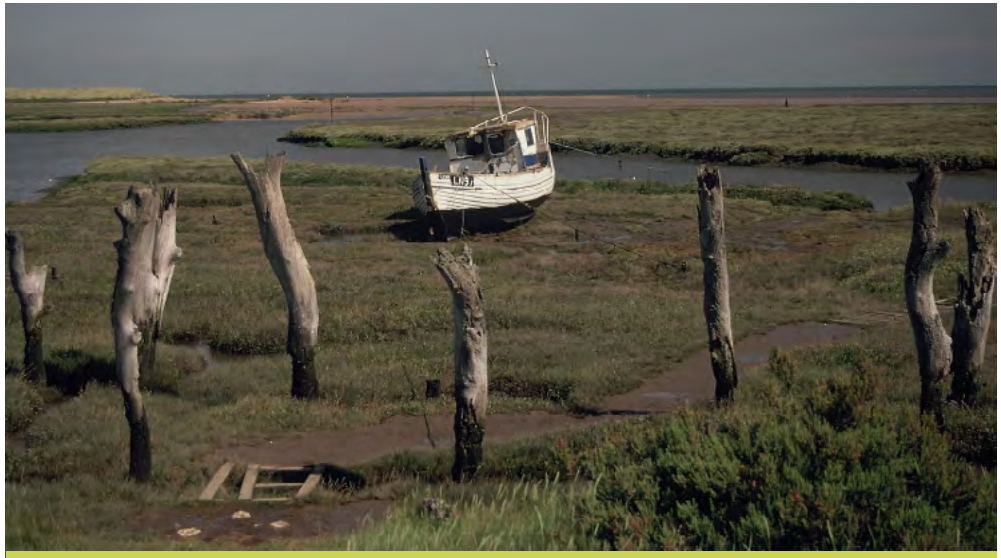
important aspect of the local culture and economy. Weekend and summer holiday periods see the influx of second home owners and holidaymakers, bringing congestion to the villages, the coast road and car parks.

The Norfolk Coast Path runs from Cromer to Holme in the west where it joins the Peddars Way, which extends into Suffolk. These trails and other footpaths are used regularly by dog walkers and birdwatchers. Golfing, sailing, boating, fishing and other water-based activities are common. The coast is popular with artists drawn by the quality of the light and the remote, wild and untamed nature of the landscape.

The landscape through time

Cretaceous Chalk forms the bedrock of the area, and strongly influences the character of its groundwater. The repeated advance and retreat of ice sheets during the Quaternary in the last 2.6 million years were instrumental in shaping the landscape of the North Norfolk Coast. Repeated cold and warm climatic phases of the Quaternary, with accompanying rises and falls of sea level, led to deposition of complex sequences of sediments which include the marine Weybourne Crag (around 1 million years ago) and the interglacial raised beach deposits at Morston (around 180,000 years ago). As ice sheets advanced they eroded the ground over which they passed, and the eroded material was deposited at the base of the ice to form layers as it melted. These deposits are occasionally fossiliferous, providing insights into the ancient landscape of this NCA. They also contain archaeological evidence in the form of stone tools for the presence of our earliest ancestors. This evidence of past climates and landscapes may also provide an insight into the potential impacts of future climate change. These Quaternary deposits are underpinned by a thick layer of till (boulder clay), for example the chalk-rich Marly Drift (around 430,000 years ago) and the Hunstanton Till (around 20, 000 years ago). Associated with the tills are suites of gravels formed at the edge of the ice sheet. The general east–west alignment of the coast records the southern limit of the last ice sheet to reach the area, and is marked by a low ridge of till.

Following the end of the last (Devensian) glaciation, sea levels rose steadily until the shape of the present Norfolk coastline was established by about 6,000 years ago; since then sea levels have risen more slowly, with fluctuations leading to some local advances and retreats of the coastline, particularly in the stretch around Thornham. Underlying chalk and glacial tills provide the foundations of the North Norfolk Coast that we see today. This can be seen in Weybourne Cliffs, and is present in the east as an offshore chalk reef which extends to beyond Cromer in the adjoining NCA.



Prehistoric ancient forest can be seen at Thornham amongst the saltmarsh.

The cliff-line at Weybourne forms a dramatic feature contrasting with the open, flat coastline elsewhere in the NCA. These eroding cliffs of chalk, sands, gravels and till are important geologically as well as scenically. Between Holme-next-the-Sea and Weybourne there are abundant soft sediments, sands, gravels and muds which are derived from glacial deposits offshore and from the cliffs to the east. They are readily shaped by wind and water action to form salt marshes, shingle banks and sand dunes. Features include the shingle spit at Blakeney Point and the offshore shingle bank at Scolt, two of the best-known coastal landforms in Britain. They are founded on ancient storm beach bars (ridges of intertidal gravel).The source of much of this gravel is likely to lie offshore, and the core of their structure is thought to be at least 4,000 years old. Extensive salt marshes have developed over thousands of years in the shelter of these features, and silts and muds are able to settle in quiet backwaters, and are colonised in time by a succession of plants.

Human influence on the coastline is significant, from as early as the Palaeolithic period, evidenced in buried peat deposits. This is particularly evident between Holme and Brancaster. Flint tools of late glacial hunter-gatherers have been found at the base of the lower peat at Titchwell, dating from over 9,000 years ago. At Holme, on the foreshore, timbers of the famous 'Seahenge' ritual monument have been dated to the early Bronze Age, about 4,000 years ago when this site was woodland. The well-preserved iron-age fort in the marsh at Holkham is associated by local legend with Boudicca's retreat. The Roman road the Peddars Way terminates abruptly at Holme, the likely embarkation point from where a ferry service crossed the Wash to Skegness. A substantial fort at Brancaster (Roman Branodunum) provided a resident Roman military presence.

Settlement is primarily clustered in small, well-separated coastal villages and former ports now largely isolated from the sea except by narrow tidal channels. This pattern of settlement developed late in the 1st millennium and the medieval period. The ports of Thornham, Brancaster, Wells-next-the-Sea, Blakeney, Wiveton and Cley next the Sea increased in prosperity from this time and during the Saxon period. These thriving ports exported grain during the medieval period to northern Europe and the Baltic and imported timber, furs and iron, and later coal. Fishing and ship-building were also important activities and Blakeney port was the only Norfolk harbour to have customs officials.

Flint churches dating from the late Saxon period and occasional windmills are landmark features, the former serving as shipping markers in the past. The church at Brancaster Staithe is notable for its re-use of Roman material from Brancaster Fort and the monastic ruins at Weybourne provide testament to the significance of monastic estates in land management until the Dissolution of the Monasteries in the 16th century. The area's traditional architecture is another highly distinctive feature. It had been largely cleared of tree cover by the 17th century, hence the greater use of brick from this period which was combined with a locally varied mix of local stone. Arts and Crafts architects made use of this tradition. A history of mixed farming, of sheep production with some arable production, was long established in the area before the Agricultural Revolution of the late 18th century. The light soils of this area were particularly suited to keeping sheep, whose manure fertilised the soil, enabling grain, especially barley, to be grown. This process and the policies of large estates drove the enclosure of the landscape and larger centralised farm holdings which extend into the adjacent North West Norfolk NCA. Major improvements in crop rotation from the late 17th century used winter feed crops, particularly turnips and grasses, and it was Thomas Coke from the Holkham Estate who became an acknowledged leader in improved husbandry and livestock techniques in the late 18th century, pioneering the Norfolk rotation.

Landowners with land on the coast began to drain salt marshes which involved their enclosure with substantial sea defence banks and the digging of numerous drains and ditches. Two of the main documented reclamations were

at Cley-next-the-Sea during the 17th century. There was also a significant area of salt marsh reclaimed at Burnham Overy. This process began in 1639 and was completed in 1859 with the building of the Wells sea wall extending from south to north along the harbour channel.

The development of the Holkham Estate in the 18th century, particularly on its seaward side, has had a significant impact both visually and culturally in this area. Although the park and Holkham Hall lie within the North West Norfolk NCA, just south of the coast road, the estate's early sea defences have, over time, led to the creation of a vast sandy beach backed by dunes and a substantial shelterbelt of pine trees. Sea walls were built at the western end of the coast in the 1860s and defences were constructed by large-scale modification of natural structures. It is thought that the reclamation of salt marsh for agriculture was one of the main drivers for the growth of Blakeney Spit (and Scolt Head Island) at the eastern end of the frontage. The reclamation generated a series of barriers by limiting drift along the shoreline and restricting sediment transport rates perpendicular to the shore.

The dynamic and ever-changing coastline has had dramatic effects on the area over time, and is best illustrated by the fluctuating fortunes of the local harbours and landing places which were of strategic and economic importance in the medieval period when the rivers were navigable. The harbour at Holkham was destroyed by the unintended effects of salt marsh reclamation in the 19th century. The ports of Blakeney, Cley, Morston and Burnham Overy Staithe have declined owing to silting caused by the westwards progress of the two spits of Blakeney Point and Scolt Head Island. These harbours are now some distance from the sea, and can only be reached along meandering mud channels at high tide. Wells-next-the-Sea is probably the most notable and lasting of the ports. The northward migration of the quay can be traced through the town, with probably a Roman quay, definitely a medieval quay and the current quay defining the shape of the town.

A fort was built at Weybourne Hope in 1588 against the threat of the Spanish Armada. An old rhyme was quoted over the centuries: "He who would Old England win must at Weybourne Hoop [Hope] begin". Troops were based at Weybourne during the First World War as there were no other anti-invasion defences elsewhere in Norfolk, and defensive trenches and concrete pillboxes were constructed as the coast shelves very steeply to deep water and this was the only place on the coastline where large military vessels could get close to shore to land tanks and troops. Thornham Marsh in the west was used during the First World War by the Royal Flying Corps as a bombing range. In 1936 a permanent camp was built at Weybourne which was occupied throughout the Second World War and afterwards. In 1959 the camp was closed, and the land acquired in the 1980s by the Muckleburgh Collection, which opened a military museum in the former army buildings.

Commercial shipping has been replaced by yachts and pleasure boats although shellfish continues to be commercially farmed and fished. The settlements along the coast road have been popular with visitors since the 18th century when people visited the Norfolk Coast attracted to the seaside resorts at Hunstanton, Wells-next-the-Sea and Sheringham, which developed as a result of the arrival of the railway. The attractive coastal settlements have largely become second-home or retirement villages and are now popular tourist destinations in their own right. They were also damaged during floods in 1897 and 1953 when the greatest storm surge recorded for the North Sea occurred and coastal defences were breached at Wells-next-the-Sea and Cley, leading to loss of life. The last commercial railway line in the area was also closed after this flood.

More recently there have been some significant changes as a result of gradual narrowing of the area as the coastal zone is squeezed between the North Sea and higher ground to the south. In due course, the 'eyes', a series of relict

mounds of gravel in the marshes deposited by the most recent (Devensian) glaciations, notably between Blakeney and Salthouse, will be eroded as the coast continues to retreat southwards. The roll-back of barriers is causing a gradual overall loss of salt marsh area as the inland edge is fixed at the higher ground or against man-made flood walls. This loss has been offset by salt marsh developing in the areas behind newly formed barriers, such as at the Holkham Gap in the 1990s.

Holkham dunes have recently seen a large amount of development of the fore dunes with the mature dune ridges being colonised by extensive flora. There has been a programme of managed realignment at Brancaster, Blakeney Freshes and Titchwell, including a relaxation of the management of the Cley–Salthouse shingle ridge as a flood defence. The dunes at Blakeney Point and Scolt Head are eroding as they are forced to roll back by wave action. Increasing areas of arable reversion to freshwater marshes have occurred owing to the uptake of Environmental Stewardship.

The Sheringham Shoal, Lincs, and Lynn and Inner Dowsing offshore wind farms are visible from the seashore and have impacted on views across the NCA. Changes have also been made to Wells-next-the-Sea harbour to ensure that commercial vessels can continue to access the port and to provide a facility for boats servicing offshore wind farms.

Much of the appeal of the North Norfolk Coast lies in its wildness and isolation, and these qualities have been reflected in the work of both writers and painters who have lived in and visited the area, and in relation to famous naval captains such as Horatio Nelson who was born just outside the NCA but is associated with the area and whose memory is celebrated fondly by locals.

Ecosystem services

The North Norfolk Coast NCA provides a wide range of benefits to society. Each is derived from the attributes and processes (both natural and cultural features) within the area. These benefits are known collectively as 'ecosystem services'. The predominant services are summarised below. Further information on ecosystem services provided in the North Norfolk Coast NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Water availability:** Rainfall is low with approximately 570 mm falling annually along the coastal strip and 670 mm falling on higher ground. Principal surface water resources within the NCA include the chalk rivers Hun, Burn, Stiffkey and Glaven. These rare and ecologically valuable rivers are heavily influenced by farming practices in the adjoining NCAs such as abstractions and run-off from fertiliser and pesticide use, as well as sewage works. Groundwater plays an important role in directly feeding the internationally important freshwater grazing marshes at Burnham Overy and providing base flow to all the rivers which in turn provide freshwater input to the intertidal areas.

Regulating services (water purification, air quality maintenance and climate regulation)

- **Climate regulation:** The coastal and marine ecosystems such as mudflats and salt marshes can aid the regulation of climate change and are vital carbon stores. Coastal habitats can respond naturally to sea level rise by moving landwards, but if this is restricted by higher ground or sea defences then this natural process is impeded and habitat is lost known as 'Coastal squeeze. Although habitats are lost and created all the time it only becomes a problem or issue if it is a result of coastal squeeze or human interference.

The trend away from arable land management towards grasslands and from drained marsh towards wet marsh and salt marsh will increase carbon storage. Seaward pressure from coastal change and rising sea levels combined with landward pressure from golf courses and expansion of agricultural land will lead to the loss of semi-natural habitats and subsequently stored carbon and carbon sequestration ability.

- **Regulating water flow:** The storage capacity for sea surges is considerable, given the vast area of salt marsh and tidal creeks, but is not sufficient to protect against extreme sea flooding as experienced in 1953 and more recently in 1978 and 1996, and which is predicted to be more common as a result of sea level rise and increased storminess.

- **Regulating coastal erosion:** The exposed nature of the dunes at Holme which is within a high energy wave environment has led to persistent erosion of the foreshore. It is thought that the changes in shoreline response at Holme are a result of historic land reclamation within the neighbouring Thornham Harbour and the changes in sediment transport pathways that this caused. The cliffs at Weybourne provide little resistance to the aggressive action of North Sea waves, which erode the base of the cliffs. In addition, when the cliff material has a high water content it becomes unstable and, together with wave action, this results in slips and slides of large amounts of material along the coastline, leading to a general retreat of the cliff-line.

- **Soil erosion:** Salt marsh soils are naturally wet and are prone to tidal flooding, as are the soils found throughout the various dune systems ranging from pioneer dunes through to consolidated dunes under low shrub. Both soil types are particularly prone to erosion and loss. Weybourne Cliffs are actively eroding with coastal and fluvial processes occurring at a natural rate. There are no coastal protection measures in place on this section of coast which is evidenced by the lack of vegetation on the cliff face.

Predicted climate change is the greatest threat to the area which is likely to become increasingly vulnerable to sea level rise and flooding.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** Almost all of the NCA lies within the Norfolk Coast AONB. The dual influences of the sea and land combine here to create a truly distinct and inspirational place – a wild, often tranquil and beautifully remote coastal landscape with great variety and texture. Mudflats, sand dunes, shingle banks, salt marsh and reedbeds contrast with small areas of arable fields growing spring barley for beer making. The clean harbour waters at Brancaster are breeding grounds for mussels and support a very local shellfish industry. Samphire, a local delicacy which has a long association with the area, and sea lavender bring seasonal colour. Coastal harbours and the string of distinctive brick and flint villages with landmark flint churches and occasional windmills provide a strong sense of place. An abundance of wildlife such as pink-footed geese and seals provide an opportunity to engage with and be inspired by nature.

  Cultural activities include creativity workshops and writer's retreats which use the natural beauty of the coast and inland habitats to provide relaxation and inspiration. Kevin Crossley-Holland successfully captured the essence of the muddy creeks and salt marshes of Burnham Overy Staithe in his poetry collection *Waterslain*. The local traditions of fishing, wildfowling and samphire gathering have frequently been depicted by the large number of amateur and professional artists who either live in or visit the area, drawn by the quality of light and the remote, wild and untamed nature of the landscape. A rich local variation in the use of traditional materials has inspired some fine examples of Arts and Crafts architecture and makes a fundamental contribution to sense of place.

- **Sense of history:** The NCA has a long history of settlement. Relicts from the Bronze Age and Saxon fish traps have been found near Holme. The area has a similarly long history of invasion and defensive structures are common. Throughout the 400 years of Roman occupation, this part of the Norfolk coast was guarded by Roman military detachments supported by garrisons based in Colchester who accessed the North Norfolk Coast via the Peddars Way. The vulnerability of this coast changed little in the post-Roman world. Anglo-Saxons and Danes used the coastal area as a staging post for landward incursions. The threat of invasion continued to the Second World War when the shingle banks at Kelling were mined to delay the pace of an expected invasion.

- **Tranquillity:** The coastal landscape can be remote with long, open, sweeping views, an overarching sky and strong influence from the sea. The NCA has a wilderness quality rare in lowland England. The area's tranquillity is highly valued by locals and visitors alike. This is more apparent during the summer months on the A149 with a 450 per cent rise in traffic during August compared with January, particularly where the road narrows considerably at Stiffkey and Cley next the Sea. In the longer term, the tranquillity of the NCA may be compromised by increases in road traffic as a result of greater visitor numbers with the majority of them coming to the area by car.

- **Recreation**: As with other areas of the Norfolk Coast, the social demographic of this area is significantly skewed to an ageing population. Outdoor recreation for local people focuses on walking, walking with dogs and sailing close to where people live. Outdoor access needs and recreational use by local people are often very different to the activities of those visiting the area.

  Access to the intertidal and marine area is a major draw, as is the coastline. The area is important for education and research with the National Nature Reserves offering opportunities for schools and universities. The NCA is an extremely popular destination, catering for both weekend

breaks and longer stays. Key resources include the scenic beauty of the coastal landscape; the beaches at Wells-next-the-Sea and Holkham; sailing opportunities afforded by the numerous small harbours; and the Norfolk Coast Path and associated network of footpaths and bridleways. Ecotourism is a growing industry and includes activities such as conservation volunteering with organisations including Norfolk Wildlife Trust, the RSPB and the National Trust. The most vulnerable sites are also the most popular, which has led to high numbers of visitors coming to the area by car, so careful management now and in the future is essential. The Norfolk Coast Cycleway (Sustrans Regional Route 30) runs just to the south of the NCA from Wells-next-the-Sea to Blakeney and National Route 1 runs from Ringstead to Wells-next-the-Sea.

- **Biodiversity**: The whole coast is richly diverse with flora, fauna and ornithological interest. The geographical position of the coast and its range of habitats make it especially valuable for migratory birds and wintering waterfowl, particularly Brent and pink-footed geese. The salt marshes are among the finest coastal marshes in Britain and among the best in Europe. The salt marsh flora is exceptionally diverse and includes a number of uncommon species. The stabilised, mature dunes have a number of uncommon salt-tolerant species and the shingle banks are colonised by specialised plants. The shallow water, and an abundant invertebrate fauna in the mud, makes the coastal lagoons important feeding sites for wintering and passage waders and waterfowl. Extensive reedbeds have developed along the coast and many of them are managed to provide the conditions favoured by rare breeding birds. Maritime pasture is present on the Cley and Salthouse marshes, where marsh foxtail, annual beard-grass and jointed rush are found. A number of relict salt marsh creeks have developed into brackish reedbeds of ornithological importance.

The breeding bird communities are of national and international importance. Migratory birds, notably waders and passerines, are present in great abundance in the spring and autumn on the marshes and intertidal areas and the shingle banks and foreshore provide suitable habitats for them. The natterjack toad, a rare amphibian in Britain, breeds in shallow pools in the dune slack. Otter and common seal are also present. The area's important habitats are vulnerable to the direct impacts of climate change, particularly from sea level rise. Loss of existing freshwater habitats would lead to losing reedbeds and grazing marsh that are essential for waders, wildfowl and other key species such as bittern and marsh harrier. Unfortunately for the little tern, the ideal nesting sites in north Norfolk are also used by large numbers of people. Walking, dog walking, kiting and other activities can all reduce the suitability of a breeding area and cause colonies to desert it. Currently, owing to recreational disturbance and predation pressures, colonies are not producing enough chicks to maintain their population in the long term.

- **Geodiversity**: The coast includes internationally important geological sites such as Blakeney Point and Scolt Head Island and also many smaller, less prominent examples of coastal geomorphology. The salt marshes, with their associated shingle structures, form a geomorphological unit of the highest importance, tracing the post-glacial evolution of the area. Dune systems occur at a number of localities along the coast but are best developed at Holme and Holkham. On Scolt Head Island and at Blakeney Point sand dunes have developed on a shingle base. Much of the area is underlain by a glacial till ridge. The salt marshes are one of the few areas on the coastline of England and Wales where salt marsh morphology, including saltpans, has been researched in detail. The marshes exhibit a progression of age and development from east to west, manifested through changes in marsh height and assemblage of geomorphological features.

Statements of Environmental Opportunity

SEO 1: Conserve and enhance this dynamic, remote and inspiring coastal landscape with its internationally important interrelated habitats of shingle, sand dunes, salt marsh, reedbeds, lagoons and mudflats, while allowing for the dynamic coastal processes that are essential to the character of this area, managing coastal squeeze, and addressing the implications of sea level rise resulting from climate change.

For example, by:

- Ensuring that the coastal features of the North Norfolk Coast remain a site of outstanding geomorphological importance and that they continue to provide both long-term and short-term bases for future study, particularly in regard to the marshes and salt marsh which are of international significance.
- Conserving the wild, open nature of the intricate mosaic of salt marsh, mudflats, lagoons, creeks and other intertidal habitats by working with landowners and the fishing community to deliver a landscape which will support conservation objectives within the protected sites and provide a financially sustainable livelihood for them.
- Identifying opportunities and mechanisms for, and promoting working with coastal processes to provide a coast protection function (for example, salt marsh creation in front of sea walls to capture carbon and the natural evolution of coastal vegetated shingle and sand dunes).
- Providing interpretational information for businesses and recreational providers about the dynamic processes under way along the coast, to help them to understand how fragile the habitats are and to ensure that visitors and local people act responsibly when visiting these sites.
- Protecting and improving the quality of intertidal and offshore waters in order to support the production of shellfish life and growth, thus contributing to high-quality shellfish products which are available for sale locally.
- Proactively pursuing realignment opportunities to allow managed adaptation to future climate change and ensure wider benefits where these can occur, and considering creating habitats inland to reduce the effect of coastal squeeze.
- Maintaining tidal flood warning infrastructure to ensure that an effective tidal flood warning service can be provided throughout the National Character Area (NCA).
- Encouraging voluntary groups and local people to help with monitoring the impact of human disturbance on little tern and ringed plover nesting sites and educating dog walkers and other recreational users about reducing their impacts on fragile habitat sites.
- Working in partnership across all sectors to deliver actions for a strong vision for the future coastline management while accepting managed transitions in character and habitat.
- Encouraging and supporting an increase in the proportion of wetland habitat with conversion from arable farmland to pasture, grazing marsh and wetland to encourage a more natural shifting mosaic of habitats.
- Conserving the integrity of active and relict landforms as products of present and past processes through development planning constraints and positive conservation management, continuing to research, monitor and record geomorphological processes, to improve our understanding of them and to inform management decisions.

SEO 2: Plan for and sustainably manage high visitor numbers to the North Norfolk Coast, particularly access to the sea and the National Nature Reserves, while recognising common rights and maintaining a living working landscape, reducing congestion on the rural roads and protecting the tranquillity and beauty which are valued by visitors and local residents.

For example, by:

- Conserving and maintaining the high levels of tranquillity, remoteness and beauty that are associated with the area by sustainably managing the level and type of tourism infrastructure developed along the coast road or in the rest of the NCA by establishing a visitor travel plan for the NCA which can identify opportunities for traffic management to reduce the impact of traffic congestion, rationalise car parking and encourage low-impact travel.
- Reviewing the zoning of fragile sites for visitors in line with the Area of Outstanding Natural Beauty (AONB) Visitor Management Plan to ensure that co-ordinated promotional material is used which contains educational messages and travel information for visitors; and considering limiting the number of visitors allowed into certain protected sites during the breeding season in order to increase the number of rare ground-nesting birds that are able to breed, such as little tern and ringed plover.
- Protecting the tranquil character of the area and avoiding intrusion into the most rural areas, and exploring opportunities for responsible tourism and voluntary 'visitor pay back' to ensure that pressure is reduced on the fragile coastal habitats, nesting birds and seal colonies.
- Enhancing the public transport network in the NCA by working with partners across all sectors to support the Coasthopper bus service to ensure that it can be used by locals and visitors and to make stronger links with the Community Rail Partnership to promote sustainable travel in the area.
- Improving access to the coast for walking, cycling and disabled people through the sustainable use of old railway lines, tracks and paths and encouraging reduced car use. Securing opportunities for the public to enjoy the natural environment through the implementation of the England Coast Path whilst ensuring appropriate protection of it.
- Exploring opportunities for sustainable tourism initiatives that can increase locals' and visitors' environmental awareness and encourage businesses to develop their ecological credentials, while working together to protect the special qualities of the area.
- Ensuring promotion of access opportunities educates people about the vulnerability of the coastal habitats in the NCA and encourages visits of a low-impact nature which avoid any adverse impacts on agricultural management, landscape, habitats and wildlife.
- Identifying additional linkages which could be created between existing public footpaths including the Norfolk Coast Path National Trail, existing permissive access routes and settlements, communities, amenities, transport links and natural public green space in areas of need as identified in access maps.
- Creating new quality areas to meet the high demand for people to walk their dogs' off-lead, away from traffic and close to communities, and working with dog owners to promote the Countryside Code and encouraging that they keep their dogs on a lead when walking in protected coastal sites.
- Encourage securing resources to sustainably manage visitor numbers and congestion.

SEO 3: Conserve, manage and increase understanding of an area which is rich in archaeological, historical and cultural heritage, offers wildness and inspiration, wide open views, beauty, a rich mosaic of wildlife habitats and seascapes of international importance, and is a cherished place to live and to visit.

For example, by:

- Protecting and appropriately managing the historic environment for its contribution to local character and sense of identity and as a framework for habitat restoration and sustainable development.
- Improving the condition of heritage assets through appropriate measures and seeking to reduce conflicting or unsympathetic management regimes while recognising the high potential in this landscape for undiscovered remains, particularly along the coastal marshes and fringe.
- Raising awareness of the value of the rich archaeological and maritime history associated with the area and the strong links to agricultural improvement and fishing.
- Working with landowners and businesses to ensure that historic landscape features are conserved and enhanced and are not at risk of degradation, and seeking to protect the most significant sites.
- Using understanding of the area's traditional and historic architecture and its distinct patterns of settlement to inform appropriate conservation and use of historic buildings, and to plan for and inspire any environmentally beneficial new development which makes a positive contribution to local character.
- Promoting the use of traditional building materials for repair of historic buildings and for new developments where this would be appropriate, to enhance the character of the local area.
- Conserving the rural character of farm buildings which are exceptionally prominent in the wider farmland landscape by ensuring that any change of use to isolated farm buildings reduces gentrification and instead enhances rural heritage and landscape character.
- Encouraging farmers, the fishing community and game producers to promote their products and the links that their food has to the NCA to build a sustainable local brand.
- Reinstating and promoting traditional reedbed management and sympathetic rotational management of existing ditches in flood plain arable, grazing marsh and arable reversion areas.
- Conserving and maintaining local features of cultural heritage importance, such as staithes, quays and boat mooring rubbing posts, and raising awareness of the value of the rich archaeology and historic time depth associated with this.
- Restoring and conserving vernacular buildings to ensure that they are sympathetic to and in keeping with local landscape character.
- Identifying and realising opportunities to conserve and enhance the outstanding natural and scenic beauty of the area in the Norfolk Coast AONB Management Plan.
- Managing arable farmland to enhance its biodiversity value, conserve water resources and adapt to climate change, by establishing arable field margins as potential nest sites for ground-nesting birds and habitats for small mammals and maintaining and restoring wet grassland for wintering/breeding waders and wintering wildfowl.
- Restoring dune stacks at Holkham and Holme to ensure that there is a succession of dune slacks at different stages of re-colonisation to provide a habitat for rare natterjack toads and other dune slack species.

Continued on next page...

SEO 3: Conserve, manage and increase understanding of an area which is rich in archaeological, historical and cultural heritage, offers wildness and inspiration, wide open views, beauty, a rich mosaic of wildlife habitats and seascapes of international importance, and is a cherished place to live and to visit.

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- Protecting and expanding areas of species-rich salt marsh, improving its structure and stability and promoting the reversion of arable land back to coastal wetland (reedbeds, grazing marsh and intertidal habitat where appropriate) so that it can gradually become a more natural, shifting mosaic of habitats.
- Conserving, restoring and preventing further loss of hedgerows and hedgerow trees, and replanting them as necessary to strengthen the landscape pattern and encourage greater birdlife and wildlife.
- Encouraging and supporting an increase in the proportion of wetland habitat with conversion from arable farmland to pasture, grazing marsh and wetland so that the coastal marshes provide more diverse food production which can be sold locally.
- Promoting good soil management on farms to improve infiltration of rainwater into agricultural land and reduce pollution through fertiliser and pesticide use, seeking opportunities for the more efficient use of natural water sources, such as through rainwater harvesting to support business and residential use and decreasing pressure on surface and groundwater abstractions.
- Commissioning research to understand the importance of freshwater flows in maintaining salinity gradients to support rare plants and species that are listed as Site of Special Scientific Interest and Ramsar features.

SEO 4: Seek to maintain and enhance the distinctive and internationally important intertidal habitat and inshore waters which provide examples of rare geodiversity, estuarine habitat and species and important cultural, historic and economic resources which are valued by local communities.

For example, by:

- Maintaining and enhancing the geological resource through the maintenance of natural coastal processes, the development of local geological conservation strategies and the assessment of the educational and research value of new sites.
- Improving understanding of the historic development of the coastal marshes and their exploitation by local communities.
- Promoting both the national and locally important geological resource through assessment and promotion of sites of educational value and on-site interpretation, including promotion of the influence of geology on local habitats and landscape.
- Identifying opportunities for geodiversity enhancement which might develop from a policy of managed realignment and re-naturalisation of sea defences.
- Encouraging sustainable methods of fishing for shellfish and fish.
- Supporting the designation of Cromer chalk reef as a Marine Conservation Zone and Marine Protection Area.
- Considering the introduction of a new licensing scheme for common rights access after consultation with stakeholders for protected and vulnerable habitats in order to prevent commercialisation of traditional and culturally important resources.
- Encouraging and managing responsible recreational use so as to minimise dune and salt marsh erosion and disturbance to nesting birds and seals, while increasing the understanding of the coastal landscape.
- Considering enhancing the appearance of Wells-next-the-Sea from the marshlands adjacent to it by appropriate design, colour of materials and the need for retention of existing trees, hedges and landscaping to prevent new 'hard edges' or to address existing and inappropriate hard edges to settlement.
- Selectively promoting sites which are able to accommodate and manage visitors effectively, to reduce recreational pressure on key wildlife habitats.

Supporting document 1: Key facts and data

Area of North Norfolk Coast National Character Area (NCA): 6,244 ha

1. Landscape and nature conservation designations

North Norfolk Coast NCA contains the Norfolk Coast Area of Outstanding Natural Beauty (AONB) which covers 100 per cent of its area. It also contains the North Norfolk Heritage Coast which extends over 83 per cent of this NCA.

A management plan for the protected landscape can be found at:

- www.norfolkcoastaonb.org.uk/

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	% of NCA
International	Ramsar	North Norfolk Coast, The Wash	4,091	66
European	Special Protection Area (SPA)	North Norfolk Coast SPA, The Wash SPA	4,091	66
	Special Area of Conservation (SAC)	North Norfolk Coast SAC; The Wash and North Norfolk Coast SAC	3,095	50
National	National Nature Reserve (NNR)	Holkham, Blakeney NNR, Scolt Head Island NNR, Holme Dunes NNR	2,696	43
	Site of Special Scientific Interest (SSSI)	A total of 8 sites wholly or partly within the NCA	4,118	66

Source: Natural England (2011)

Please note: (i) Designated areas may overlap (ii) all figures are cut to Mean High Water Line, designations that span coastal areas/views below this line will not be included.

There are 4,091 ha of land covered by international nature conservation designations (66 per cent of the total land area). In total 4,118 ha of the NCA are nationally designated. The NNRs are also designated as SSSI.

There are 4 local sites in the North Norfolk Coast NCA covering 18 ha which is <1 per cent of the NCA.

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm
- Details of Local Nature Reserves (LNR) can be searched at: http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_search.asp
- Maps showing locations of Statutory sites can be found at: http://magic.Defra.gov.uk/website/magic/ – select 'Rural Designations Statutory'

1.1.1 Condition of designated sites

SSSI condition category	Area (ha)	Percentage of NCA SSSI resource
Unfavourable declining	0	0
Favourable	3,882	94
Unfavourable no change	237	6
Unfavourable recovering	0	0

Source: Natural England (March 2011)

- Details of SSSI condition can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/reportIndex.cfm

2. Landform, geology and soils

2.1 Elevation

The North Norfolk NCA is low lying with an average elevation of 5 m. The lowest point within the NCA is 0.2 m below sea level; the highest is 52 m above the sea.

Source: Natural England (2010)

2.2 Landform and process

The North Norfolk Coast is a tight, narrow band of land defined by the A149 coast road and the northern edge of the Cromer Ridge. Erosion and deposition are extensive features of this coast, as the strata that once formed its cliffs, now confined to the outer limits of this area, are nearly all of soft or loosely-aggregated glacial sands, gravels and clays. North of Scolt Head the Burnham Flats, an offshore area of unusually shallow sea extending 25 km offshore, help to create the special coastal scenery which is both very varied and constantly changing. The flatness and shallowness of the Flats allows vigorous erosion of the sea bed by storm waves. Long-shore currents and wave action then deposit the eroded material and sediment further west along the coast, forming the only classic UK example of a barrier beach system. Extensive sand and shingle banks, spits and offshore islands shelter a complex zone of intertidal flats, salt marsh and mud flats divided up by tidal channels. The extensive offshore beach barrier island of Scolt Head and the large, shingle spit of Blakeney Point dominate the coastal landscape. Both are actively accreting westwards and are topped by sand dunes, which on Scolt Head form a complex sequence of ridges and dunes. Sand dunes occur at various locations, but are best developed at Holme and Holkham. Here several stages of dune development are present, with calcareous foredunes, yellow dunes and stable grey dunes. Large areas of clean mobile sand, subject to fully marine conditions, characterise this open coast. The North Norfolk coast is not though a fully natural system. Over half of its salt marsh area has been reclaimed by man over the past 3 centuries.

Source: North Norfolk Coast Countryside Character Description, An Inventory of UK Estuaries.

2.3 Bedrock geology

Almost all of the NCA (95 per cent) has a bedrock geology that consists of 96 per cent Chalk, with the remaining 4 per cent consisting of gravel and sand. Flints are a common feature in the upper layers of the Chalk, and are the major component of the river and beach gravels.

Source: North Norfolk Natural Area Profile

2.4 Superficial deposits

The whole area is covered by glacial drift and post-glacial deposits of varying depths. Deposits at Holkham are evidence of the last time that the glaciers extended south coming to a halt along the North Norfolk coast during the Devensian about 30,000 to 10,000 years ago. The gravels, sands, chalk erratics and boulder clays left behind after the ice age still determine the natural vegetation patterns.

Source: North Norfolk Natural Area Profile

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	6
National	Mixed Interest SSSI	4
Local	Local Geological Sites	0

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm

2.6 Soils and Agricultural Land Classification

The soils over much of the NCA are comprised of coastal soils: sand dunes formed from shingle and blown sands, and saltmarsh soils developed on clays and sands.

Source: Land Use Consultants Ecosystems Services Data

The main grades of agricultural land in the NCA are broken down as follows (as a proportion of total land area):

Grade	Area (ha)	% of NCA
Grade 1	0	0
Grade 2	300	<1
Grade 3	1,898	30
Grade 4	967	15
Grade 5	0	0
Non-agricultural	2,788	45
Urban	26	<1

Source: Natural England (2010)

- Maps showing locations of Statutory sites can be found at: http://magic.Defra.gov.uk/website/magic/ – select 'Landscape' (shows ALC classification and 27 types of soils).

3. Key water bodies and catchments

3.1 Major rivers/canals

The following major rivers/canals (by length) have been identified in this NCA.

- River Glaven 2 km
- River Stiffkey 1 km

Source: Natural England (2010)

Please note: Other significant rivers (by volume) may also occur. These are not listed where the length within the NCA is short.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 5,517 ha, 88 per cent of the NCA

Source: Natural England (2010)

3.3 Water Framework Directive

Maps are available from the Environment Agency showing current and projected future status of water bodies at:

http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

4. Trees and woodlands

4.1 Total woodland cover

Total woodland cover is very low within this NCA with a total woodland cover of just 3 per cent.

Source: Natural England (2010), Forestry Commission (2011)

4.2 Distribution and size of woodland and trees in the landscape

Woodland is not typical of this landscape outside of Holkham. The Holkham estate is significant for the shelterbelts of pine trees that protect the park and give vertical definition to the edge of the enormous sandy beach beyond.

Source: Countryside Quality Counts 2003

4.3 Woodland types

A statistical breakdown of the area and type of woodland found across the NCA is detailed below.

Area and proportion of different woodland types in the NCA (over 2 ha)

Woodland type	Area (ha)	% of NCA
Broadleaved	65	1
Coniferous	121	2
Mixed	0	0
Other	1	0

Source: Natural England (2010),Forestry Commission (2011)

Area and proportion of ancient woodland and planted ancient woodland within the NCA.

Type	Area (ha)	% of NCA
Ancient semi-natural woodland	3	<1
Planted Ancient Woodland (PAWS)	0	0

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Boundaries in the North Norfolk Coast NCA are characterised by low, gappy hawthorn hedgerows and drainage ditches (with their associated reeds).

Source: North Norfolk Coast Countryside Character Area description; Countryside Quality Counts (2003)

5.2 Field patterns

The coastal zone is characterised by the extensive and near continuous band of managed wetland and drained enclosures inland. The extensive north-west Norfolk landscape of 18th and 19th century hedged and fenced semi-regular enclosure is still very recognisable, but noticeably affected by boundary removal and field enlargement in the later 20th century. Small areas of this inland landscape band are within this NCA.

Source: English Heritage Historic Profile, Countryside Character Area description; Countryside Quality Counts (2003)

6. Agriculture

The following data has been taken from the Agricultural Census linked to this NCA.

6.1 Farm type

Data on farm type from the agricultural census is incomplete (with published entries for only 12/19 holdings.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Due to the small number of holdings within this NCA the Agricultural Census Data for farm size is not available.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

Due to the small number of holdings within this NCA the Agricultural Census Data for farm ownership not available.

Source: Agricultural Census, Defra (2010)

6.4 Land use

Due to the small number of holdings within this NCA the Agricultural Census Data for land use is not available.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Due to the small number of holdings within this NCA the Agricultural Census Data on livestock numbers is not available

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

Due to the small number of holdings within this NCA the Agricultural Census Data on Farm Labour is not available.

Source: Agricultural Census, Defra (2010)

Please note: (i) Some of the Census data is estimated by Defra so will not be accurate for every holding (ii) Data refers to Commercial Holdings only (iii) Data includes land outside of the NCA belonging to holdings whose centre point is within the NCA listed.

7. Key habitats and species

7.1 Habitat distribution/coverage

Key habitats across the area include intertidal sand and mud flats, saltmarsh, sand dunes, shingle, freshwater grazing marsh, reedbed and lagoons.

Source: North Norfolk Natural Area Profile

7.2 Priority habitats

The Government's new strategy for biodiversity in England, *Biodiversity 2020*, replaces the previous Biodiversity Action Plan (BAP) led approach. Priority habitats and species are identified in *Biodiversity 2020*, but references to BAP priority habitats and species, and previous national targets have been removed.

Biodiversity Action Plans remain a useful source of guidance and information. More information about *Biodiversity 2020* can be found at;

http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/englandsbiodiversitystrategy2011.aspx

The NCA contains the following areas of mapped priority habitats (as mapped by National Inventories). Footnotes denote local/expert interpretation. This will be used to inform future national inventory updates.

Priority habitat	Area (ha)	% of NCA
Coastal and floodplain grazing marsh	943	15
Lowland meadows	890	14
Purple moor grass and rush pasture	880	14
Lowland dry acid grassland	820	13
Coastal sand dunes	593	10
Coastal vegetated shingle	104	2
Mudflats	100	2
Fens	92	1
Maritime cliff and slope	30	<1
Lowland heathland	28	<1
Reedbeds	23	<1
Saline lagoons	18	<1

Source: Natural England (2011)

- Maps showing locations of priority habitats are available at: **http://magic.Defra.gov.uk/website/magic/** select 'Habitat Inventories'

7.3 Key species and assemblages of species

- Maps showing locations of priority habitats are available at: **http://magic.Defra.gov.uk/website/magic/**
- Maps showing locations of S41 species are available at: **http://data.nbn.org.uk/**

8. Settlement and development patterns

8.1 Settlement pattern

The North Norfolk Coast NCA is characterised by a lack of settlements and roads on the coastal marshes, but distinctive brick and flint villages with landmark flint churches and occasional windmills are strung along the coast

Source: North Norfolk Coast Countryside Character Area description; Countryside Quality Counts (2003)

8.2 Main settlements

There are no major settlements in the NCA. Blakeney and Wells-next-the-Sea are the largest with Wells being the only settlement on the North Norfolk Coast that is still used by commercial shipping.

Source: North Norfolk Coast Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular and building materials

Flint, from the Chalk, with some brick is the dominant building material, usually with pantiled roofs, except in the extreme west of the area, where carstone is used. Along the coast flint has characteristically been used showing the flints with their rounded and often white exterior crusts. Elsewhere walls consist of 'knapped' flints displaying a flatter black face outwards.

Source: North Norfolk Coast Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

The area has a long history of settlement, supported by the fertile soils of the coastal strip and the resources and communications afforded by the sea. Roman settlement was extensive, including a 2nd century fort and Saxon Shore fort at Brancaster, and embarkation point for sea transport to the north east. Settlement is primarily clustered in small well separated coastal villages and former ports which are now largely isolated from the sea except by narrow tidal channels such as Blakeney and Wells. There is a strong maritime tradition in the area which is supported by it being where Sir Admiral Nelson grew up.

Source: Countryside Quality Counts Draft Historic Profile, Countryside Character Area description

9.2 Designated historic assets

This NCA has the following historic designations:

- 1 Registered Park and Garden covering 3 ha
- 0 Registered Battlefields
- 7 Scheduled Monuments
- 238 Listed Buildings

Source: Natural England (2010)

- More information is available at the following address:
  http://www.english-heritage.org.uk/caring/heritage-at-risk/

  http://www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/

10. Recreation and access

10.1 Public access

- 59 per cent of the NCA, 3,712 ha is classified as being publically accessible.
- There are 83 km of public rights of way at a density of 1.3 km per km^2.
- There is 1 National Trail (Peddar's Way and Norfolk Coast) within the NCA.

Sources: Natural England (2010)

The narrow A149 coast road is the main access route to the NCA.

The table below shows the breakdown of land which is publically accessible in perpetuity:

Access designation	Area (ha)	% of NCA
National Trust (Accessible all year)	1,102	18
Common Land	1,216	19
Country Parks	0	0
CROW Access Land (Section 4 and 16)	1,243	20
CROW Section 15	664	1
Village Greens	1	<1
Doorstep Greens	0	0
Forestry Commission Walkers Welcome Grants	3	<1
Local Nature Reserves (LNRs)	0	0
Millennium Greens	0	0
Accessible National Nature Reserves (NNRs)	3,023	48
Agri-environment Scheme Access	0	0
Woods for People	102	2

Sources: Natural England (2011)

Please note: Common Land refers to land included in the 1965 commons register; CROW = Countryside and Rights of Way Act 2000; OC and RCL = Open Country and Registered Common Land.

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) the lowest scores are found around the populated areas like Holkham and along the A149. The highest scores are on the coast and at isolated points like Blakeney point.

A breakdown of tranquillity values for this NCA is detailed in the table below:

Category of tranquillity	Score
Highest value within NCA	49
Lowest value within NCA	-35
Mean value within NCA	19

Sources: CPRE (2006)

- More information is available at the following address: **http://www.cpre.org.uk/what-we-do/countryside/tranquil-places/in-depth/item/1688-how-we-mapped-tranquillity**

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows a similar pattern to the tranquillity scores with the most disturbed areas around settlements and roads.

A breakdown of intrusion values for this NCA is detailed in the table below.

Category of intrusion	1960s (%)	1990s (%)	2007 (%)	% change (1960s-2007)
Disturbed	<1	N/A	6	5
Undisturbed	75	57	N/A	N/A
Urban	0	0	0	N/A

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are hard to specify as the data is incomplete but it is noticeable that there is a drop of 18 per cent between the 1960s and the 1990s in undisturbed landscapes.

- More information is available at the following address: http://www.cpre.org.uk/resources/countryside/tranquil-places

On the coastal plain reclaimed freshwater grazing marshes fringed by reedbeds, commonly cut for thatching, are a key feature.

12. Data sources

- British Geological Survey (2006)
- Natural Area Profiles, Natural England (published by English Nature 1993-1998)
- Countryside Character Descriptions, Natural England (regional volumes published by Countryside Commission/Countryside Agency 1998/1999)
- Joint Character Area GIS boundaries, Natural England (data created 2001)
- National Parks and AONBs GIS boundaries, Natural England (2006)
- Heritage Coast Boundaries, Natural England (2006)
- Agricultural Census June Survey, Defra (2000,2009)
- National Forest Inventory, Forestry Commission (2011)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- Priority Habitats GIS data, Natural England (March 2011)
- Special Areas of Conservation data, Natural England (data accessed in March 2011)
- Special Protection Areas data, Natural England (data accessed in March 2011)
- Ramsar sites data, Natural England (data accessed in March 2011)
- Sites of Special Scientific Interest, Natural England (data accessed in March 2011)
- Detailed River Network, Environment Agency (2008)
- Source protection zones, Environment Agency (2005)
- Registered Common Land GIS data, Natural England (2004)
- Open Country GIS data, Natural England (2004)
- Public Rights of Way Density, Defra (2011)
- National Trails, Natural England (2006)
- National Tranquillity Mapping data, CPRE (2007)
- Intrusion map data, CPRE (2007)
- Registered Battlefields, English Heritage (2005)
- Record of Scheduled Monuments, English Heritage (2006)
- Registered Parks and Gardens, English Heritage (2006)
- World Heritage Sites, English Heritage (2006)
- Incorporates Historic Landscape Characterisation and work for preliminary Historic Farmstead Character Statements (English Heritage/Countryside Agency 2006)

Please note all figures contained within the report have been rounded to the nearest unit. For this reason proportion figures will not (in all) cases add up to 100%.
The convention <1 has been used to denote values less than a whole unit.

Supporting document 2: Landscape change

Recent changes

Trees and woodlands

- Woodland is not characteristic of this landscape. Corsican and black pines were purposely planted in the early 20th-century to help stabilise the dunes and natural succession is taking place at the western end of Holkham dunes where younger woodland has gradually extended west colonising the dunes. At the central and particularly eastern end of the dunes, deciduous woodland has also colonised.

- Trees have been planted as shelter belts on some fields and these are having a negative impact on intrinsic landscape character as it is changing the character of the landscape and the long views.

Boundary features

- Changes to cropping patterns from pasture to arable have greatly changed the character of the relatively small fields. These were traditionally bounded by water filled ditches with bio diverse sides and a high water table in the reclaimed drained marsh.

- Changes in the water table itself have also had profound effect on landscape character particularly in the appearance of the ditches and on land cover vegetation.

- There has been a continuing decline and loss of landscape features such as hedgerows, field margins and farm ponds as a result of maximising field size, lack of field margin appropriate management and spray drift.

- Fencing is replacing traditional gappy hedged boundaries.

Agriculture

- Increased farm diversification and the adoption or reuse of farm buildings for commercial, industrial and storage uses, and new uses of 'marginal' land, including smallholdings and leisure uses has led to a weakening of intrinsic character and a negative visual impact as a result of unsympathetically designed buildings.

- Managed realignment at Brancaster West Marsh in the 1990s has led to potential saline inundation which has led to a reversion to salt marsh resulting in a loss of grazing marsh.

- There has and will continue to be change to the freshwater grazing and reedbeds in Cley and Salthouse as a result of the shingle bank no longer being artificially steepened, and now being allowed to manage and re-profile itself in a more natural way. This means that the shingle ridge is a more resilient, robust feature, but will, along with the marshes, be subject to periodic over-topping by the sea.

- On some coastal grazing marshes scrub encroachment is becoming a problem due to a lack of appropriate grazing regime.

Settlement and development

- Properties are being enlarged and improved or sub-divided all of which may affect the appearance and character of settlements. Significant numbers of new properties have been either sited within or outside existing settlements such as in Blakeney and Weybourne, which have tended to undermine the traditional form of road and settlement patterns together with their characteristic vernacular building appearance.

- The development of tourism infrastructure including car parks along the coast road and at popular visitor sites has significantly weakened landscape character and reduced tranquillity and feelings of remoteness due to increased traffic levels.

- Increased pressure on rural roads as a result of an increase in holiday homes, second homes and tourist activity in coastal villages has had a marked impact on the quiet character of historic settlements particularly during the holiday periods.

Semi-natural habitat

- Changes to the agricultural economy, the introduction of Environmental Stewardship payments and the rise in interest in environmental management have seen positive changes to reinstate or improve existing non-built features, mainly grazing marsh and water level management. The areas of nature reserve near Cley have remained fairly constant.

- Potential loss of limited grazing marsh back to salt marsh through managed retreat (realignment) and loss of salt marsh through coastal squeeze. In Holme and Blakeney lack of grazing on the dune systems has led to the development of vegetation dominated by coarse grasses. A grazing regime has been introduced to address this.

- Disturbance and truncation of habitats such as marsh and salt marsh has occurred by inappropriate access recreation. Further pressure from increase in numbers of visitors and to increase tourism infrastructure and associated facilities remain an ongoing issue.

- Conflicts between National Nature Reserve (ecological) status and people are now arising, and the carrying capacity of this landscape in comparison with its ecological and visual importance needs to be carefully considered and appropriately managed.

Historic features

- About 29 per cent of historic farm buildings remain unconverted. Most are intact structurally.

- The harbour area of Wells-next-the-Sea has developed a strong character but one which has changed considerably during the past 10 years with the loss of commercial cargo vessels and handling facilities and the rise of leisure craft and the newly built infrastructure required for the Sheringham Shoal Wind Farm. The harbour and main creeks have a very 'car park' appearance in summer due to the numbers of small craft moored in them.

- In 1999 a small wooden circle named 'Seahenge' consisting of an oval ring of between 48 and 55 oak posts was uncovered at Holme-next-the-Sea by shifting sands in the eroding peat beds on the beach.

Coast and rivers

- A successful scheme has been put in place to realign the Glaven channel at Blakeney Freshes, at the same time relaxing management of the shingle ridge between Cley and Salthouse after the flood event in 2007 reshaped the shingle completely creating a much flatter but more natural and resilient profile. This has resulted in improved drainage of the marshes behind the bank in the event of over-topping by the sea. Some negative change has occurred by the re-alignment works which has resulted in a reduced ecological carrying capacity. This became the second realignment scheme aimed at adapting to coastal change on the North Norfolk Heritage Coast, the first being a smaller scheme at Brancaster and a third one which has been completed at Titchwell.

- Offshore wind farms which are close enough or large enough to 'enclose' or create a 'limit' to the skyline and horizon can impact on the perception of remoteness and wilderness in this seascape.

- The planned 'managed retreat' of the shingle bank management in the NCA has altered the appearance and character of the area. Further dynamic changes as a result of changed coastal processes.

- The popularity of the area for recreational purposes (for example boating, seal visits, bird watching and walking) has put considerable pressure on this landscape and is having a detrimental effect on ecology (disturbance to nesting birds from dogs, visitors, light aircraft and noise from power boats), in terms of the sheer numbers of people who walk and use the area, and the infrastructure which has been necessary to cater for them. Car and boat parks can be highly intrusive during the season (which has greatly extended and has relatively few 'off season periods'), both physically from a distance and locally when one walks through or near them and this colours the perception of the area as full of people and cars.

- A scheme of undergrounding previously overhead electricity and telephone lines and equipment at Holme-next-the-Sea has reduced visual impact and clutter.

Minerals

- There is currently no extraction of minerals in this NCA.

Drivers of change

Climate change

- The North Norfolk coast is particularly sensitive to the effects of climate change. Changes in the form of increased temperatures, wetter winters and more extreme weather events have been identified in the last 10 years. Annual temperature is likely to rise by between 2 and 3.5°C over the next century with more frequent high summer temperatures and very cold winters becoming increasingly rare.

- Sea levels rise between 26 and 86 cm above the current level over the next century will affect the coastal areas which are critical and irreplaceable natural assets supporting diverse internationally important species composition, habitat fragmentation, water resources, soils, agricultural land use, recreation and tourism and cultural heritage.

- Rising sea levels and coastal squeeze will create challenges around the need to maintain intertidal and coastal habitats in situ (such as dune systems) and the need to allow the natural dynamic movement of coastlines. Managed realignment and nourishment of eroded beaches and intertidal habitats are potentially ways of assisting this. There is a need to protect valuable inland coastal habitats, such as grazing marsh, reedbeds and saline lagoons, in situ as far as possible or relocated in other locations where their present sites are lost or are unsustainable.

- Coastal grazing marshes, reedbeds and saline lagoons in their current locations will, in the long term, tend to be ephemeral due to increased inundation of sea water during storm tides and flooding, and seepage through shingle ridges and dune systems. This will ultimately cause their transformation into saltmarsh or other intertidal habitat.

- There will be future pressure for further intensification of the coastal grazing marsh habitats; however there is also possible future potential for salt marsh habitat creation and restoration through managed realignment along certain stretches of the coastline.
- Increases in sea levels, especially if coupled with increases in storm activity, may cause greater erosion causing potentially complete loss, or at least change to something quite different for many habitats of habitats such as intertidal mudflats and salt marsh and also soil erosion. Rising sea levels may also affect agricultural land, which is currently located on reclaimed marshland and destroy freshwater marshes and deter the special species that rely on them, for example wintering wildfowl, birds, moths and snails.
- Damage to historic landscapes and archaeological sites may occur through erosion from sea level rise and flooding, as well as through changes in farming practice and soil desiccation.
- Indirect effects on dunes include atmospheric nutrient deposition, and coastal squeeze due to rising sea atmospheric nutrient deposition and coastal squeeze due to rising sea levels and increased storminess.
- Difficulty in protecting Holocene peat beds with associated archaeology as at Titchwell and Holme-next-the-Sea in a dynamic coastal environment and need to protect them through the local planning process.
- Managed retreat strategy in the face of rising sea level rise needs to be attuned to accommodate a future for ground water seepages on the landward edge of saltmarsh which is a nationally rare habitat for invertebrates.
- Intensification of arable farming practices due to food security issues resulting in a decline and potential loss of hedgerows at field boundaries.
- Disturbance and erosion of sensitive coastal habitats and species as a result of both land and water based recreation activities.
- Pressure for parking facilities associated with coast and coastal villages (with associated visual intrusion and localised increase in carbon omissions).
- Disturbance of sense of remoteness and tranquillity as a result of increased tourist and visitor pressure and increased traffic on the A149.
- Drainage and water abstraction, eutrophication and pollution of ground and water sources including from pesticides are a threat to grazing marsh as they are highly sensitive to nutrient loading.

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

The following analysis section focuses on a selection of the key provisioning, regulating and cultural ecosystem goods and services for this NCA. These are underpinned by supporting services such as photosynthesis, nutrient cycling, soil formation and evapo-transpiration. Supporting services perform an essential role in ensuring the availability of all ecosystem services.

Biodiversity and geodiversity are crucial in supporting the full range of ecosystem services provided by this landscape. Wildlife and geologically-rich landscapes are also of cultural value and are included in this section of the analysis. This analysis shows the projected impact of Statements of Environmental Opportunity on the value of nominated ecosystem services within this landscape.

Holkham is one of four National Nature Reserve found along the coast. Thousands of pink footed geese can be seen here in winter.

Statement of Environmental Opportunity	Ecosystem Service: Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 1: Conserve and enhance this dynamic, remote and inspiring coastal landscape with its internationally important interrelated habitats of shingle, sand dunes, salt marsh, reedbeds, lagoons and mudflats, while allowing for the dynamic coastal processes that are essential to the character of this area, managing coastal squeeze, and addressing the implications of sea level rise resulting from climate change.	↘ *	o ***	↔ **	↗ ***	o ***	o ***	↔ ***	↗ ***	↔ ***	↗ ***	↗ ***	o ***	↘ ***	↗ ***	↔ ***	↗ ***	↔ ***	↗ ***	↗ ***
SEO 2: Plan for and sustainably manage high visitor numbers to the North Norfolk Coast, particularly access to the sea and the National Nature Reserves, while recognising common rights and maintaining a living working landscape, reducing congestion on the rural roads and protecting the tranquillity and beauty which are valued by visitors and local residents.	↔ ***	o ***	↘ ***	↔ ***	o ***	↔ ***	↔ ***	↘ ***	↔ ***	↘ ***	N/A	↔ ***	↘ ***	↔ ***	↔ ***	↓ ***	↗ ***	↔ ***	↔ ***

Note: Arrows shown in the table above indicate anticipated impact on service delivery: ↑ = Increase ↗ = Slight Increase ↔ = No change ↘ = Slight Decrease ↓ = Decrease. Asterisks denote confidence in projection (*low **medium***high) ° symbol denotes where insufficient information on the likely impact is available.

Dark plum = National Importance; Mid plum = Regional Importance; Light plum = Local Importance

Statement of Environmental Opportunity	Ecosystem Service: Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 3: Conserve, manage and increase understanding of an area which is rich in archaeological, historical and cultural heritage, offers wildness and inspiration, wide open views, beauty, a rich mosaic of wildlife habitats and seascapes of international importance, and is a cherished place to live and to visit.	↗ ***	o	↗ ***	↗ ***	o	↗ ***	↗ ***	↔ ***	↗ ***	↗ ***	↗ ***	↗ ***	↘ ***	↗ ***	↗ ***	↔ ***	↔ ***	↗ ***	↗ ***
SEO 4: Seek to maintain and enhance the distinctive and internationally important intertidal habitat and inshore waters which provide examples of rare geodiversity, estuarine habitat and species and important cultural, historic and economic resources which are valued by local communities.	↗ ***	o	↗ ***	↗ ***	o	↔ ***	↔ ***	↔ ***	↔ ***	↔ ***	↔ ***	↔ ***	↘ ***	↗ ***	↗ ***	↔ ***	↔ ***	↗ ***	↗ ***

Note: Arrows shown in the table above indicate anticipated impact on service delivery: ↑ = Increase ↗ = Slight Increase ↔ = No change ↘ = Slight Decrease ↓ = Decrease. Asterisks denote confidence in projection (*low **medium***high) ° symbol denotes where insufficient information on the likely impact is available.

Dark plum = National Importance; Mid plum = Regional Importance; Light plum = Local Importance

Landscape attribute	Justification for selection
Dynamic changing coastal landscape exhibiting outstanding geology and geomorphological processes.	■ The coastal landscape and processes are a significant visual element of this area. ■ The North Norfolk coast is connected to the Wash via a sediment transfer system and together they form one of the most important marine sedimentary environments the UK. ■ The wealth and diversity of wild species has resulted in the area being designated a Special Area of Conservation and includes extensive areas of varying sediments for example sub-tidal boulder and cobble communities and mixed muds, sands and gravels with shells and stones, subject to a range of conditions; again, often a very visible aspect of this landscape. ■ A stunning and diverse coastal landscape of great variety and texture exhibiting a classic example of a barrier beach system. Extensive areas of salt marsh interspersed with tidal creeks that have developed behind sand and shingle bars feature interspersed with intertidal mudflats, sand dunes, reedbeds and harbours. ■ The sheltering 'barrier island' of Scolt is a classic coastal geomorphological feature and behind it, the Burn Estuary and an extensive network of creeks and ditches wind through large expanses of salt marsh and mudflats to create an ever changing, intricate environment. ■ The historical salt marsh enclosures and coastal protection schemes have had marked influence on the current form of the coast. They are of international significance and some of the finest coastal marshes in Britain rich in floristic diversity. ■ The eroding cliffs at Weybourne have geological exposures of national importance, showing early Pleistocene marine deposits of the Weybourne Crag resting on Cretaceous Chalk. ■ Interglacial raised beach deposits at Morston provided nationally important evidence of fluctuating relative land and sea levels in the Pleistocene. ■ Wildlife habitats, and the species they support, are influenced by the geology, as are types of agriculture and other land use, which add to the area's distinctive character. ■ Large shallow inlets and bays with sand and gravel communities characterised by burrowing worms that tolerate the abrasive action of the mobile coarse sediment. These communities form important feeding areas for birds. ■ The Cley–Weybourne shingle ridge, which supports a range of rare plant species and is of great physiographic interest. ■ Archaeological interest of the Holocene peat beds in Holme-next-the-Sea, Thornham and Brancaster.

Landscape attribute	Justification for selection
The North Norfolk Coast is one of the most important marine areas on the North Sea coast, rich in natural, historical and cultural resources with the land and seascape supporting a rich mosaic of internationally important habitats.	■ Mud communities contain invertebrate populations of intertidal mudflats and sand flats provide a rich food resource attracting large numbers of waterfowl and fish species at high tide, and other invertebrates which are the prey of higher organisms such as seals. ■ The world's longest chalk reef has recently been discovered off the coast of the NCA between Cley-next-the-Sea and Trimingham in the adjacent NCA, and is rich in wildlife, supporting sponges, sea slugs, fish, crabs and lobsters. ■ Glasswort or samphire and other annuals colonising mud and sand are generally termed pioneer salt marsh. This develops at the lower reaches of salt marshes where the vegetation is frequently flooded by the tide. ■ Atlantic salt meadows found on the lower, middle and upper salt marsh which is un-grazed and extensive and form an almost continuous belt over 35 km covering 2,200 ha. These salt marshes are some of the most botanically rich in Britain. ■ Traditional activities are culturally and economically important. Local residents exercise common rights including samphire gathering, bait digging and wildfowling, and they have contributed to the long-term maintenance of designated sites. ■ The fishing industry in North Norfolk is renowned for its unique and traditional nature and for daily landings of live shellfish of outstanding quality. Some of the families who fish today have done so for many generations, fishing from local beaches with small boats and selling relatively small catches direct to their own merchants. ■ The historical salt marsh enclosures and coastal protection schemes have had marked influence on the current form of coast.

Landscape attribute	Justification for selection
The area is renowned for its outstanding natural beauty and tranquillity, remote and wild landscape and seascape.	■ The area has been designated as an Area of Outstanding Natural Beauty reflecting the special scenic qualities of the area. ■ The exposed marshlands are a rare wilderness, where natural forces predominate. They are dissected by meandering tidal creeks, which form intricate dendritic patterns in the mud. ■ This is an exposed, uninterrupted landscape with a strong, simple break between land and sky. There is a sense of remoteness and wildness. The marshes are devoid of trees or settlement, but views inland are defined by woodland, agricultural land and boats moored within the creeks. ■ The drained marshes are an open landscape with an unwooded character with long views from the more elevated landscapes inland. The panoramic views are defined by wide skies with a simple horizon and the apparent lack of subdivision in the landscape exaggerates the overriding sense of expanse. ■ The vast majority of the area is a remote, peaceful landscape, but there are pockets of intense activity for example at the beach areas near Holkham, Wells and Cley. ■ Remote and open chalk land plateau farmed landscape with only sparse settlement, homesteads built of brick or carstone and flint. Low gappy hawthorn hedgerows and drainage ditches, with their associated reeds, run along field boundaries with woodland landscape on the Cromer ridge. ■ Highly valued landscapes that are unspoilt by modern-day standards; the charm and character of its villages and coastal settlements, and the opportunity for 'escapism' combine to provide an attractive proposition to both second home owners tourists and day visitors alike. ■ A patchwork of dunes, shingle, mudflats, brackish lagoons and reed beds, which provide a cohesive visual unit and contribute to a generally undisturbed and natural character.

Landscape attribute	Justification for selection
A combination of assets that offer an extensive range of water and land based recreational opportunities.	■ The area attracts an enormous number of visitors particularly in the summer, recreational activities available including bird watching, seal watching, and water sports and walking. There are high numbers of second homes, holiday homes and the area is popular as a retirement destination. ■ Strong impressions of an area which is preserved and generally unspoilt. Combined with the proposition of staying in a coastal settlement of quaint and unspoilt character and charm, presents a strong coherent and recognisable product which is attractive to visitors. ■ The Norfolk Coast Path, a national trail which runs east to west and links to the Peddars Way at its western end which was used by 87,000 walkers and was voted Best Coastal Path in Britain in 2011. ■ Settlement is relatively sparse and concentrated in large villages and one small town along the A149 which are so popular in the summer that they become congested with traffic at peak periods particularly in Holkham, Wells-next-the-Sea, Stiffkey and Cley-next-the-Sea. ■ People have been attracted to the Norfolk coast by its special character, landscape and wildlife since the 19th century with the introduction of the railways. Artists and writers have been inspired by its beauty while Cley Marshes and Blakeney Point have been renowned for their bird life for more than 150 years.

Landscape opportunities

- Protect the wild open nature of the intricate mosaic of salt marsh, mudflats, lagoons, creeks and other inter-tidal habitats.
- Plan for climate change mitigation and adaption in the coastal habitats.
- Plan for increased natural intertidal habitats through managed retreat and the programmed withdrawal of sea defences in response to sea level rise.
- Increase protection for archaeological sites on the coastal plain and on the more elevated farmland to the south.
- Allow natural coastal processes to predominate and conserve and enhance the delicately balanced dynamic mosaic of costal wetland habitats so that the Drained Coastal Marshes gradually becomes a more natural, shifting mosaic of habitats.
- Maintain and enhance habitats supporting populations of breeding, wintering and migratory wetland birds.
- Maintain and enhance areas of coastal habitats in particular dunes, shingle and salt marsh to act as a coastal defence.
- Protect and enhance un-grazed salt marshes and dune habitats and promote sustainable recreation.
- Protect the area's high levels of tranquillity, sense of remoteness, far reaching views and dark skies by considering impacts on tranquillity and sense of place on potential development within, on and just outside the area's boundary.
- Protect the generally undisturbed undeveloped character and related strong sense of remoteness and tranquillity.
- Encourage and support an increase in the proportion of wetland habitats with conversion from arable farmland to pasture and grazing marsh.
- Manage and enhance the range of habitats associated with farmland birds.
- Protect panoramic and open views across the area and beyond to adjacent landscape character areas.
- Protect the generally scattered and isolated settlement pattern throughout the area.
- Develop coordinated management of recreation throughout the open coastal marshes to protect sensitive habitats and species.
- Ensure development avoids prominent skyline locations and consider the visual impact of new development (particularly tall vertical developments) both within the coastal marshes and on adjacent coastal slopes.
- Ensure development associated with 'pockets' of concentrated visitor activity is sensitively designed. Manage visitor numbers, taking account of the 'red or orange zones' identified in the Norfolk Coast AONB Visitor Management Strategy so that people are steered away from the most sensitive landscape and wildlife sites towards more robust areas.

Ecosystem service analysis

The following section shows the analysis used to determine key ecosystem service opportunities within the area. These opportunities have been combined with the analysis of landscape opportunities to create Statements of Environmental Opportunity.

Please note that the following analysis is based upon available data and current understanding of ecosystem services. It does not represent a comprehensive local assessment. Quality and quantity of data for each service is variable locally and many of the services listed are not yet fully researched or understood. Therefore the analysis and opportunities may change upon publication of further evidence and better understanding of the inter-relationship between services at a local level.

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Soils through agricultural management Grasslands and grazing marsh Tidal waters supporting lobster and crab production; intertidal habitats supporting shellfish populations	Twenty-five per cent of the land is under agricultural management for arable crops including winter wheat, potatoes and sugar beet. Spring barley for beer production grows well on the sandy soils and the distinctive coastal climate helps extend the natural ripening process. Grassland is extensively grazed by beef cattle and some sheep. The total annual weight of fish and shellfish landed in the NCA in 2009 was 566,333 kg and included: lobster 42,634 kg; mussel 50,311 kg; bass 725 kg; whelk 725 kg; velvets 228, 645 kg; and skate and ray 7,267 kg. **Continued on next page...**	Regional	Agricultural use of the land is restricted by the topography and proximity to the sea. There are small areas of pasture and arable on the coastal plain where the land has been artificially drained. Inundation from the sea as a result of sea level rise and failure of the drainage network puts these arable and grazing areas at risk. The most valuable arable areas are found between, Old Hunstanton Golf Course to Thornham, Gun Hill to Wells harbour, and Wells harbour to Cley. More spring crops are likely to be grown as increased warming affects yields of winter wheat. There is likely to be a big increase in demand for irrigation for agriculture as	Encourage sensitive farming practises that result in good stewardship of the land, and encourage biodiversity. Manage land sustainably to improve the ecological carrying capacity of rare freshwater flooded grazing marsh habitat, and allow grazing to take place. Promote agri-environment schemes to landowners in arable areas where benefits from arable reversion to grazing marshes could be realised. Investigate alternative methods of ensuring crops are resistant to affects of climate change, for example by plant breeding and the use of new varieties.	**Food provision** **Biodiversity** **Water availability** **Regulating water quality** **Sense of place / inspiration** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision cont		**... continued from previous page** Other foods include samphire, produce from game, shooting and wildfowling.		water is taken from groundwater or rivers during the summer which will affect river flows and other water supplies. Grassland coverage has returned to levels last seen in the 1990s, as a result of Environmental Stewardship Schemes and arable reversion. Fishing continues to be an important industry in Wells and Blakeney, although the economic viability of traditional fishing industries is under pressure. The water quality is suitable to support fish of indigenous species and the production of shellfish. In the last 30 years there has been a decline in the number of long-standing fishing families still involved. Future changes in water quality and sediment movement and supply may threaten fish and shellfish stocks as a result of sea level rise.	Work in partnership with local farmers, fisherman and food producers to promote connections between product and place to increase value and market recognition of high quality local produce. Work with game shooting managers, wildfowlers and samphire gatherers to ensure a good ecological balance is maintained, protecting continued local specialist food products and ecological integrity.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Existing woodland cover	Woodland cover is very limited covering only 3 per cent of the NCA. There is no commercial plantation and timber production is for firewood only. 88 ha of coniferous pinewood were planted on Holkham beach to provide stability for the dunes.	Local	Further woodland planting is generally incompatible with local character and conditions. The removal of woodland for landscape and biodiversity purposes, including the invasion of pine trees at Holkham and the scrub encroaching on sand dunes at Holme can be considered a source of local wood fuel.	Arisings from scrub clearance and conifer removal can be used as a source of local wood fuel.	**Timber provision** **Sense of place / inspiration** **Climate regulation**
Water availability	Surface water catchment	Rainfall is low with approximately 570 mm falling along the coastal strip and 670 mm falling on higher ground, per year. Principal surface water resources include the catchments of the chalk rivers of the Hun, Burn, Stiffkey and Glaven. These rare and ecologically valuable chalk rivers are heavily influenced by farming practices in the adjoining NCAs from abstractions, and water treatment. **Continued on next page...**	Local	All freshwater outlets are used as important roost sites for migratory birds. The freshwater marsh and freshwater wet grassland attract numerous wintering and breeding wildfowl and waders. Groundwater plays an important role in directly feeding the freshwater grazing marshes at Burnham Overy. It provides base flow to the river which provides freshwater input to the intertidal areas. Water abstraction, already close to what is considered to be sustainable, will be a growing problem, causing challenges for wetland habitats[5].	Promote good farming practice to improve the structure of agricultural soils, thereby improving infiltration of rainwater and, while reducing surface flow. Promote more efficient use of natural water sources, such as through rain water harvesting, to support business and residential use. Promote conservation of water resources by raising awareness of the issues associated with climate change and drying out of habitats, and household consumption.	**Water availability** **Sense of place / inspiration** **Food provision** **Biodiversity**

[5] www.ukcip.org.uk/wordpress/wp-content/PDFs/Regis_summary.pdf

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability cont	Surface water catchment	**...continued from previous page** Abstraction levels: River Burn has no water available; River Stiffey currently over-abstracted and moving to over licensed; River Glaven is over-licensed; River Hun, has water available. Consumption of water from households in unmetered properties is high in the area[6].		Groundwater abstraction from within or the NCA could lower the water table, resulting in the drying-out dry-out ground water seepages on the landward edge of the saltmarsh which is a nationally rare habitat for invertebrates. The NCA is narrow, especially the terrestrial portion, so even abstraction wells outside the NCA could lower the water table (the width of the risk zone would need to be assessed). Summer drought could result in the drying out of valuable wetland habitats. Water will need to be conserved and used more efficiently, to enable the protection and restoration of wetlands and river habitats. There is increasing demands for water abstraction for public water supply for new development. Seasonal and temporary increases in the local population will impact upon water resources, with consequences on river flows of the neighbouring NCAs, which feed the freshwater systems of the North Norfolk Coast.	During high winter river flows water can be stored for use in summer periods.	

[6] *A Regional Action Plan for the Anglian Region*, Environment Agency

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Sea beet Norfolk Royal Russet apples	These plants are commonly found and have traditionally been foraged by local people. Theses apples originate from Burnham Over Staithe. 12 hectares of orchard in Thornham contain 150 varieties of apples; 100 come from East Anglia. Pears and soft fruit are also grown.	Local	Sea beet is a wild ancestor of the cultivated varieties of beet. The Romans valued it both for human and animal food. The genetic resources contained within traditional orchards are under threat, but maintained where orchard restoration and management initiatives are in place.	Raise awareness of the need to retain the generic resource of these plants for wildlife and people. Encourage people to gather plants wisely and to be aware of wildlife considerations.	**Genetic diversity** **Sense of history** **Recreation** **Food provision** **Biodiversity**
Biomass energy	Limited firewood	Limited resources due to the limited woodland cover and patterns of land use.	Local	There is little potential for biomass cropping because of the adverse impacts upon the landscape and existing habitats.	Identify sources of local wood fuel from scrub management and pine plantation clearance.	**Biomass energy** **Sense of place / inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Salt marshes Mudflats Dunes Intertidal sand flats Reedbeds Marshes Permanent pasture Peat and soils with high organic content	The shallow water ecosystems of the coast are important sites for carbon storage. The geomorphic and ecological stability is driven by interactions between the flow of water, vegetation growth and sediment transport[7]. Projects that build resilience and adaptation to change have been completed at Brancaster and Cley and are underway at RSPB Titchwell. The change from arable land management to grasslands and from drained marsh to wet marsh and saltings over recent years has increased carbon storage. Salt marsh covers 29 percent of the NCA and acts as a carbon sink. They can also act as an important defence against sea level rise, as the carbon laid down by plants such as sea grasses help to raise the elevation of the land.	Regional	Coastal squeeze could occur and would result in the marshes and upper saltmarsh being less able to store the carbon and fulfilling a flood defence function which is an important service as sea walls are protected by healthy salt marsh in front of them. Sea-levels rise between 26 cm and 86 cm above the current level will affect critical coastal areas that contain irreplaceable assets[8]. Irreplaceable habitats are likely to be destroyed which will result in a loss of stored carbon. The shallow water ecosystems of the coast are important sites for carbon storage. The geomorphic and ecological stability is driven by interactions between the flow of water, vegetation growth and sediment transport[7]. The shallow waters off the NCA contain beds of seagrass which store 10 times as much carbon as a temperate forest. **Continued on next page...**	Seek opportunities to return arable land on the coastal plain, to fresh water marshes through the take up of Environmental Stewardship. Work with the farming community on the agricultural land of the coastal plain to establish sustainable grazing regimes to allow for enhanced carbon storage in the form of increased organic matters in soils. Align sea defences to maximise the creation of marsh and thus carbon storage capacity and flood management benefits where habitats buffer flood walls. Rising sea-levels and coastal squeeze will create challenges around the need to maintain intertidal and coastal habitats in situ (such as dune systems) and the need to allow the natural dynamic movement of coastlines.	**Climate regulation** **Biodiversity** **Regulating coastal erosion** **Reducing flooding** **Sense of place / inspiration** **Geodiversity** **Regulating water flow**

[7] *Major role of marine vegetation on the oceanic carbon cycle. Biogeosciences 2, 1–8, CM Duarte, JJ Middelburg and N Caraco (2005)*

[8] Marine Climate Change Impacts Partnership

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation				**... continued from previous page** Coastal squeeze could occur and would result in the marshes and upper salt marsh being unable to fulfil a carbon storage function. Rising sea-levels and coastal squeeze will create challenges around the need to maintain intertidal and coastal habitats in situ (such as dune systems). Managed realignment and nourishment or eroded beaches and inter-tidal habitats are potentially ways of assisting this. There is a need to protect valuable inland coastal habitats, such as grazing marsh reedbeds and saline lagoons, in situ as far as possible or relocated where present sites are lost or are unsustainable, in order to increase the area of high carbon storage capacity across the area. Coastal grazing marshes, reedbeds and saline lagoons, in their current locations, will in the long term be transient due to inundation of sea water during storm tides and flooding, and seepage through shingle ridges and dune systems. This will ultimately cause their transformation into salt marsh or other intertidal habitat. Salt marsh sequesters higher levels of carbon and emits lower levels of methane and can be 'more' stable in the long term.	Managed realignment and nourishment of eroded beaches and inter-tidal habitats are potentially ways of assisting this. There is a need to protect valuable inland coastal habitats, such as grazing marsh, reedbeds and saline lagoons, in situ as far as possible or relocated where their present sites are lost or are unsustainable. Coastal grazing marshes, reedbeds and saline lagoons in their current locations will, in the long term, tend to be ephemeral due to increased inundation of sea water during storm tides and flooding, and seepage through shingle ridges and dune systems. This will ultimately cause their transformation into saltmarsh or other intertidal habitat. Continue to liaise with key local landowners to encourage an understanding of carbon storage and sequestration capacity of coastal habitats.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Soils Permanent pasture Hedgerows, ditches and drain act as barriers to sediment movement Coastal and marine habitats	The groundwater resource of the NCA is predicted to be under pressure (of poor qualitative status) by 2015 although the quantitative (chemical) status remains good. The biological and chemical water quality for the rivers Burn, Glaven and Stiffkey in 2008 ranged from good to very good for both chemical and biological quality. Blakeney is designated for shellfish under the Shellfish Waters Directive (2006/113/EC). The ground water chemical status on the NCA is generally poor. The ecological potential status of all the rivers in the NCA is 'moderate'. Water dependant Special Areas of Conservation on land are in favourable condition whereas the marine areas are in unfavourable condition. Bathing water and recreational water at Wells-next-the-Sea is good.	Local	The North Norfolk Rivers is a priority catchment under the England Catchment Sensitive Farming Delivery Initiative (ECFDI) where soil erosion is causing sedimentation of watercourses. As a result of (ECFDI) vital management work has taken place along the Glaven and the Stiffkey rivers. The rare and ecologically valuable chalk rivers of the Norfolk coast have been subject to increasing pressures with poor water quality and quantity resulting in degradation of habitats and ecology, siltation, invasion from non-native species and reduction in fish stocks. Although the quality of the groundwater is good there is a risk from pollution from agricultural activities can easily enter the marine habitats either through groundwater absorption or more directly via run-off into rivers. Freshwater fish and shellfish water are of satisfactory quality, although changes from valley bottom grazing land (water meadows) to intensive arable agriculture has led to increased silt in the rivers, smothering the gravel beds that are important fish spawning areas as well as characteristic plant and insect habitats.	Work with land owners and farmers to adopt a catchment-wide approach to improving natural river function, enhancing water quality, improving key habitats and boosting community involvement and make them aware of the Capital Grant Scheme for Catchment Sensitive Farming. Investigate innovative ways to make arable farming on the coastal strip more sustainable and reduce pollution of water courses, by for example using seaweed as a source of fertiliser[9], where appropriate. Monitor and review changes in water quality and sediment movement to maintain fish production and to ensure management changes can be made if necessary. Work with farmers and landowners to reduce diffuse pollution from land management.	**Regulating water quality** **Regulating water flow** **Regulating soil erosion** **Biodiversity**

[9] http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/coastal.pdf

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Coastal and marine habitats Soils	The NCA has limited freshwater storage capacity. The rivers Glaven, Stiffkey and Burn are fast flowing chalk streams which lend themselves to rapid run-off. River flooding has affected many properties on the rivers Burn and Stiffkey. River flooding is exacerbated by high tides resulting in 'tidal lock' on rivers. The River Burn and Hun can suffer from low flows of water during the summer months. The storage capacity for sea surges is considerable, given the vast area of salt marsh and tidal creeks. T he capacity is not sufficient to protect against extreme sea flooding as experienced in 1953 and more recently in 1978 and 1996.	Local	Because the Cromer ridge is extremely free-draining, the catchment of these minor rivers has a history of flash flooding. Sluices on rivers prevent flooding from the sea but also reduce connectivity and can exacerbate river flooding upstream. A consequence of the rivers not being able to flow freely to the sea during high tide (called tidal locking), will result in flooding for people, infrastructure and land. The River Stiffkey is prone to seasonal flooding on its lower reaches onto adjacent wet grassland and this area is now being positively managed for higher water level. Land which is susceptible to flooding from the sea due to sea level rise includes semi-natural habitats, golf courses and grade 4 agricultural land. Creeks are also likely to silt up making navigable access (via dredging) impossible and unsustainable. Low flows resulting from abstraction for public water supply and irrigation have been identified as a cause for concern for the Burn and the Hun increasing infiltration and slowing the flow of water.	Promote good soil management to improve infiltration of rainwater. Improve and restore the continuity between the rivers and their flood plains within and upstream of this NCA to increase capacity to help address and accommodate flood water during periods of 'tidal lock'. Maintain volumes and flows in rivers during the summer months by conserving water use on farms and in the settlements.	**Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Biodiversity** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Geology Soils Natural vegetation Soil flora and fauna Agricultural land	Nearly 90 per cent of the NCA is comprised of coastal soils; sand dunes formed from shingle and blown sands, and salt marsh soils developed on clays and sands, which are too saline to be useful for arable production. The embanked and drained marshes now comprise moderately fertile loamy and clayey soils. On higher ground, shallow, but moderately fertile to fertile lime-rich and base-rich soils over chalk and glacial deposits predominate. There are 6 main soil types in this NCA; loamy and clayey soils of coastal flats with naturally high groundwater, covering 32 per cent of the NCA; salt marsh soils (29 per cent); sand dune soils (14 per cent); shallow lime-rich soils over chalk (10 per cent); freely draining slightly acid but base-rich soils (8 per cent); and freely draining slightly acid sandy soils (4 per cent).	Regional	The loamy and clayey soils of coastal flats with naturally high groundwater have a high agricultural potential, especially to the east of the area, but this is dependent on the continued ability to pump drain and protect the soils from sea flooding and saline intrusion. Locally some soils are saline and at risk of structural damage where drained. These soils are increasingly under threat of loss from sea level rise where there is a combination of high silt and fine sand content this can result in compaction or soil capping. The grazing marsh which was arable land in 1997 has been supported by agri-environmental schemes enabling improved soil quality by encouraging deeper root penetration, increased organic matter and improved soil flora and fauna. There is a risk of potential degradation of soil qualitythrough intrusion from the sea.	Promote good soil management on farms to improve infiltration of rainwater, reduce pollution through fertilizer and pesticide use and the use of low ground pressure machinery and well timed cultivation. Where appropriate support an increase in the proportion of wetland habitat with conversion from arable farmland to pasture and grazing marsh so that the coastal marshes gradually become more natural, resulting in improved soil quality.	**Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Water availability** **Climate regulation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Coastal habitats Arable land Cliffs Rivers and watercourses	The coast from Old Hunstanton to Weybourne is in a state of relative equilibrium, with erosion and accretion. This may change in the long term depending on extent to which sea level rise and storminess increases. Salt marsh soils found under coastal salt marsh vegetation and the sand dune soils are naturally wet and are prone to tidal flooding and soil erosion and loss. Soil erosion can occur as a result of autumn cultivation of arable crops. The lime-rich soils are unstable and prone to loss through erosion. The acid sandy soils are also at risk which is exacerbated after continuous arable cultivation or if the soils are compacted. The sand dunes and sandy soils are mobile; in some respects it is in their very nature to move. Wetter clay and loamy soils, particularly those with long-standing vegetative cover, such as grazing marsh are less prone to erosion. Sandy and lime-rich soils over chalk are prone to water erosion if left exposed. The lightest soils comprise over 18 per cent of soils and these are more vulnerable to both wind and water erosion.	Regional	During the Second World War, the majority of dune systems were used for the construction of defensive installations, for military training or both. The resultant widespread erosion had a severe effect on dune vegetation which has since been reversed by protective measures and natural recovery. These impacts are still noticeable at Holme. There has been a trend in recent years towards re-wetting of dry grassland to brackish marsh and wet grazing marsh. This has come about partly because of the higher wildlife value of wetter rough marsh, salt marsh and reedbeds but also the difficulties inherent in maintaining the flood defences in the longer term coupled to the financial value of agri-environment incentives. These marshes protect soils further inland from erosion. Some arable management, for example the late lifting of sugar beet, can damage soil structure and lead to erosion. **Continued on next page...**	Work with farmers and land owners to identify and adopt best soil management practices for the range of land uses in this area, including appropriately timed and minimal cultivation of light sandy soils, the use of cover crops and reversion to grazing marsh. Seek to maintain and improve the structure and stability of salt marsh soils and ensure that there are appropriate levels of grazing to maintain vegetation. Identify and provide appropriate management of visitors and visitor guidance on dune systems to prevent damaging and erosive trampling and excessive recreational use of old static dunes. Identify and provide appropriate management of visitors and visitor guidance on dune systems to prevent damaging and erosive trampling and excessive recreational use of old static dunes.	**Regulating soil erosion** **Food production** **Biodiversity** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion cont				**... continued from previous page** In certain areas where there is high footfall the distinctive dune system and salt marsh, are both fragile habitats and can suffer accelerated erosion by trampling and recreational pressure.		
Pollination	Extensive areas of semi-natural habitat including salt marshes and field boundaries and margins	Lowland meadows and flood plain grazing marsh support a variety of nectar sources for pollinating insects. Where arable cropping dominates, farm track verges are key sources of both pollen and nectar. These habitats are particularly important as they support the insects that pollinate commercial arable crops.	Local	Coastal and flood plain grazing marsh provide valuable nectar sources for pollinating insects. Management for improving nutrients and biodiversity is likely to increase sward diversity. There are significant areas of un-grazed salt marsh in the coastal plain which are floristically diverse and could be expanded.	Protect and expand areas of species rich salt marshes and grasslands to enable a wider spread of connected network of habitats which are suitable for pollinating. Re-instate field boundaries where appropriate and expand the extent of floristically diverse field margins.	**Pollination** **Food provision** **Biodiversity**
Pest regulation	Extensive coastal and intertidal habitats	Interstitial habitats provide important over-wintering habitats for predatory species, for example ground and rove beetles, which feed on pests.	Local	Careful management of agro-chemicals (through Integrated Pest Management approaches) may remove the requirement for chemical intervention, although further research is required.	Financial support for farmers channelled through agri-environment schemes can fund the creation and maintenance of habitats beneficial to predatory species which in turn may benefit productivity in arable areas.	**Pest regulation** **Biodiversity** **Sense of place / inspiration** **Regulating water quality**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating coastal erosion and flooding	Extensive coastal and intertidal habitats Sea defence banks	The majority of the NCA has a low-lying northward facing coastline. The Environment Agency flood risk map indicates that a majority of the NCA is at risk of tidal flooding. The majority of the North Norfolk coast (96 per cent of profiles) is natural and not artificially held by defences of any kind. As a result beaches have been able to behave naturally and roll back in response to natural processes. The intertidal mudflats dissipate wave energy, thus reducing the risk of eroding salt marshes, damaging coastal defences and flooding low-lying land. Over half the defences along the coastline are manmade earth embankments. Around 15 per cent are classed as natural defences and are either sand dunes or shingle. There are a few sections of undefended land. **Continued on next page...**	Regional	Without any further active intervention the built sea defences will stop functioning within 20 years, but maintaining them in their current position will become unsustainable threatening coastal settlements, archaeology and buildings and potential damage to characteristic and designated coastal habitats. Projected rises in sea level will have significant impacts by accelerating the natural erosion of coastal and intertidal habitats, and changing the pace and nature of natural geomorphological processes. Realignment could lead to the creation of other valuable and characteristic habitats. The natural development of the frontage with dune and shingle habitats may protect reclaimed land.	Reduce the current bank and channel maintenance and flood defence maintenance but maintain and enhance areas of coastal habitats in particular dunes, shingle and salt marsh to act as a coastal defence. Proactively pursue realignment opportunities to allow managed adaption to future climate change and ensure wider benefits where these can occur. Consider creating habitats inland to reduce the effect of rising sea levels, and identify larger areas for rollback. Maintain navigation channels to ensure the long term future of settlements and tourism income on the coast as a whole.	**Regulating coastal erosion and flooding** **Biodiversity** **Sense of place / inspiration** **Geodiversity** **Recreation** **Climate regulation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating coastal erosion and flooding cont		**... continued from previous page** The current built sea defences are in good or fair condition. The current sea defences are in variable condition; some will no longer be maintained which presents opportunities for coastal habitats as well as challenges. 54 per cent of the area has shown an erosional trend of the foreshore over the last 20 years with nearly 40 per cent of profiles showing a steepening trend[10]. Fore dunes along much of the coast and the Holme and Brancaster Bay, and Blakeney Point are experiencing rapid erosion. There has been a gradual loss of salt marsh due to the rollback of the beach barriers, offset by new areas developing. Substantial active coastal erosion is evident in the soft cliffs between Weybourne and Sheringham where there is no coastal protection. **Continued on next page...**		The cliffs between Weybourne and Sheringham erode easily and provide sediment for coastal features and are relatively stable.		

[10] http://www.channelcoast.org/anglia/analysis_programme/

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating coastal erosion and flooding cont		**... continued from previous page** There are four main areas of accretion in the area; at Stiffkey marshes, Blakeney Point, Old Hunstanton dunes and Titchwell. The most significant accretion trend was at Blakeney Point dunes, 4.7 m/yr. The NCA area, (apart from Weybourne Cliffs) is within the North Norfolk Shoreline Management Plan - Kelling to Lowestoft Ness Shoreline Management plan adopted in 2012 which it divides into 3 'super frontages.' It suggests a move to a more sustainable shoreline management by increasing the role of natural processes, while continuing to sustain flood defence to all existing low-lying dwellings and important infrastructure. The Shoreline Management Plan (SMP 6) where it covers Weybourne Cliffs promotes a naturally functioning coastline with minimal human intervention with beach material to be replenished through cliff erosion and sediment to move freely along the coast feeding shingle ridges to the west[11].				

[11] www.eacg.org.uk/smp5.asp, http://www.northnorfolk.org/smp6/smp6_adopted.html

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration	Undeveloped coast line and dynamic landscape with fragile habitats Close association with the sea Abundance of biodiversity and marine life Distinctive and unspoilt brick and flint coastal villages and Wells town Historic and cultural heritage Tranquillity and deeply rural location Farming , fishing and tourism Expansive seaward and coastal views	The dual influences of the sea and land combine to create a truly distinct and inspirational place. A wild, often tranquil and beautifully remote coastal landscape with great variety and texture but which is under increasing pressure. Coastal harbours and the string of distinctive brick and flint villages with landmark flint churches and occasional windmills provide a strong sense of place. The NCA is a popular visitor destination both for local residents and with people prepared to travel long distances for example, holiday makers and for rare sightings of birds. Wells-next-the –Sea is the only town and commercial port and is a vital employment and service centre. **Continued on next page...**	National	Traffic and congestion during peak tourism periods is one of the key complaints of locals and visitors alike. Development of further car parking areas at key coastal sites poses significant threats to the maintenance of the highly sensitive character of this landscape. There are settlements along the coast which are very sensitive and any additional development beyond their current boundaries could begin to severely erode their character and the character of the landscape. Over development and 'gentrification' of the few isolated farm dwellings may have a detrimental effect on the NCA character. The potential commercialisation of some of the traditional cultural activities such as samphire gathering and bait digging are causing concern locally due to over exploitation.	Conserve the strong sense of remoteness and tranquillity and consider whether any further development of visitor infrastructure will detract from landscape character, causing further damage to fragile habitats which are already at risk from visitor pressure. Use local materials characteristic of the area in new development, and make reference to local vernacular. Work in partnership with tourism and recreational providers and users to find innovative ways to manage visitor pressure and congestion so it does not detract from its sense of place and landscape character.	**Sense of place / inspiration** **Sense of history** **Recreation** **Biodiversity** **Tranquillity** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration cont		**... continued from previous page** One of the few remaining examples of relatively undeveloped and unspoilt coastal areas of this character. The settlements attract a significant number of tourists, particularly in the summer months, and at weekends, which are concentrated in certain areas. As the coast road is narrow traffic movement can be very slow. Over 1.2 million traffic movements were recorded in Brancaster during 2012. Over 90 per cent of visitors use their cars to visit the area. This area attracts outstanding numbers and variety of birds. RSPB Titchwell reserve is one of the most visited Nature reserves in the country. **Continued on next page...**		Offshore wind farms are having a significant impact on the long views out of the NCA to the east and west and changing the character of the landscape. The areas vulnerability to climate change, its popularity and pressure for development and related infrastructure, present enormous challenges and is likely to result in landscape change which could alter the areas character making it less attractive to locals and visitors.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration cont		**... continued from previous page** People are drawn to the area for recreational activities, the quality of light and the remote, wild and untamed nature of the landscape, and local traditions of fishing, wildfowling and samphire picking. The area is popular as a film and television location, with artists, academics and for educational visits. There is a strong association with eminent naval figures, such as Nelson who was born just outside the NCA. The coastal harbours, once used for both fishing and international trade, have been the focal point for much of the settlement. These are now important locations for tourism businesses, second homes and retirement homes.				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Ancient sites and monuments Roman sites Maritime history Settlement closely associated with the sea Simple local vernacular Holkham estate Defensive structures Drainage and reclamation features Historic transport links	The coastal position of the NCA has made it a target for invasion from the earliest of times and defensive monuments are common within the landscape and provide a strong sense of history. There is a long history of settlement. The bronze-age relict 'Seahenge' which is of international importance was discovered at Holme-next-the-Sea on Holocene peat beds in 1999 as dunes eroded. It is believed to be a ceremonial structure once situated in woodland. The strong maritime tradition of the area from the earliest times can be seen at Brancaster where there is a Saxon shore fort and Saxon settlement, and the Roman fort of Branodunum. Saxon fish traps of great significance have also been found in Holme. There is a heavily defended early Roman enclosure at Thornham accessed from the south via the Peddars Way. **Continued on next page...**	National	Historical and archaeological records and geological research show, that the coastline has been changing shape for centuries and there are records of many 'lost villages' along the cliffs. There has been and will continue to be a loss of heritage assets as a result of coastal erosion. The Holocene peat at Holme is vulnerable as it is not protected from recreational access although it has been recommended that it should gain protection by becoming a marine conservation zone. The Norfolk Archaeological Survey of the Norfolk coast suggests that structures associated with maritime industries have been 'much neglected and poorly studied and there are sites which require further study, due to decline in maritime connections and expansion of tourism facilities.' [12]	Raise awareness of the value of the rich archaeological and maritime history associated with the area and the strong links to agricultural improvement and fishing. Work with landowners and businesses to ensure that historic landscape features are conserved and enhanced and are not at risk of degradation. Seek to protect the most significant sites. Maintain and restore traditional farm buildings, listed buildings and features of maritime and archaeological interest to preserve cultural heritage and sense of place. Seek opportunities to use the former rail lines as alternative and safer routes for walking and cycling, which encourage people to reduce their reliance on cars and reduce congestion.	**Sense of history** **Food provision** **Geodiversity** **Water availability** **Sense of place / inspiration**

[12] Norfolk Archaeological Report – North Norfolk Coast

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history cont		**... continued from previous page** William Coke from Holkham estate was an agricultural pioneer during the 18th-century and the land reclamation that was carried out during his time shapes the landscape today. Seaside holidays have been a feature of the area, since the arrival of the railways leading to the development of Wells, Sheringham and Hunstanton. The threat of invasion continued during the First and Second World Wars when the coastline was heavily defended. Buildings at risk include: St Mary's Church Brancaster, Branodunum the Roman fort at Brancaster and the ruins of the Augustinian Priory in Weybourne. **Continued on next page...**		The Augustinian Priory is vulnerable to structural collapse and weathering. St Mary's church in Brancaster has a leaking roof and the Branodunum is at risk of flooding.	Undertake further study of maritime monuments that can provide insight into land use, past environmental exploitation and subsequent sustainable management, and coastal change.	

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Sense of history cont		**... continued from previous page** Scheduled monuments within the 1 in 1,000 year tidal flood zone include: Blakeney chapel; Guildhall Blakeney; tumulus on Warborough Hill, Stiffkey; iron-age hill fort, Holkham; Roman fort, Brancaster; Village cross, Titchwell; St Mary's Carmelite friary and Holy Well, Burnham Market. Abandoned railway lines which closed as a result of the 1953 flood can be seen near Holkham, while other lines at Wells and Weybourne are important heritage railways.				

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Tranquillity	Wetland landscape, seascape and coastal zone Areas away from settlements and A149 Dark skies	With the exception of the areas around the settlements on the coast road, which is very busy during the summer and at weekends, this is an area of very high tranquillity and one of the most tranquil areas in the county. A sense of tranquillity and dark skies at night are particularly associated with the remote areas of salt marsh, sand dunes and mudflats.	Regional	The number of people visiting the area has a profound effect on its tranquillity particularly in the summer months, and although alternatives to car use are available only 5 per cent use the Coasthopper bus, walk or cycle. High seasonal traffic levels particularly where the road narrows at Cley and Stiffkey makes it difficult for walkers and cyclists and has significant visual impacts on landscape and tranquillity. Outside the settlements there is very little light pollution which adds to the tranquillity of the area although lights from the offshore wind farms are changing this. The increasing pressure on the landscape from visitors, boat noise, erosion, cars, and disturbance to nesting birds are a threat to open coastal marshes which is a highly sensitive component of the landscape.	Consider reducing the environmental impact of travel and increase tranquillity by reducing the number and length of trips made by car. Make it easier for people to use sustainable modes of transport, such as the CoastHopper bus, walking or cycling. Carefully consider lighting associated with roads, security and buildings to reduce the negative effect on the sense of remoteness.	**Tranquillity** **Recreation** **Sense of history** **Geodiversity** **Sense of place / inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Open access to beaches and coastal waters for water recreation and seal watching. Network of public rights of way including a national trail and permissive access Access to coastal landscapes for baiting digging, samphire harvesting and wildfowling 3 golf clubs Military museum 3 tourist railways	The entire North Norfolk Coast is an extremely popular visitor destination catering for weekend breaks, longer stays and day visitors. There is one campsite and two hostels. Tourism provides much of the employment locally and residents and visitors are both active recreational users. Along the coast is a continuous serious of National Nature Reserves and nature reserves, some with visitor centres. All have beach access and are important for volunteering, bird watching and education and are used equally by locals and Around 700,000 people visit the reserves each year, these are the best available estimates. [13] Volunteers contribute just under 3,000 days of work a year on the nature reserves. Muckleborough Tank Museum in Weybourne attracts 60,000 visitors a year, and the Wells and Walsingham Railway that terminates in Wells attracts 20,000 visitors a year (2003). [14] **Continued on next page...**	National	The Nature Reserves attract thousands of visitors and are vital to the local economy, but tension exists between visitor pressure and the environment that attracts the numbers of visitors. There is evidence that shingle-nesting ringed plovers and little terns are already being seriously affected. The Wash and North Norfolk Coast European Marine site recommend that the number of car parking places at fragile sites should be reduced along with the level of promotion[15]. Holkham with its enormous sandy beach is the largest NNR in England at 4,000 ha. It is under the greatest pressure from the number of visitors with up to 1 million per year. Ninety per cent of the reserve is open access land making it challenging to manage. Further development, which would attract more visitors coming by car, should be avoided.	Manage recreation and access opportunities in a way that prevents any damage to the special qualities and features of the area. Commission research to improve understanding of the travel habits of visitors and residents to understand how to increase the level of sustainable travel options available for recreational users and tourists. Consider undertaking a leisure travel plan for the whole NCA in consultation with key stakeholders. Extend awareness of access and recreational opportunities available outside the NCA which provide alternative attractions for people away from coast.	**Recreation** **Sense of place / inspiration** **Tranquillity** **Biodiversity** **Geodiversity**

[13] Study to Assess the Capacity of International Sites to Accommodate Visitor Pressure, Norfolk Wildlife Services (October 2012)

[14] North Norfolk Visitor Attraction Study

[15] http://www.washandnorthnorfolkcoastems.co.uk/downloads/PDF/Coastal-Disturbance-Study%20Presentation-06-06-11.pdf

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation cont		**... continued from previous page** Research indicates that only 3 per cent of visitors to the reserves use the bus, 4 per cent walk and only 1 per cent cycle, and the main reason for visiting was bird watching (86 per cent). The Norfolk Coast Path national trail runs the length of the coast and 87,000 walkers used the trail in 2011 and it was voted Best Coastal Path in Britain. Recreational activities include sailing, boating, seal trips, water and jet skiing, and kite flying, horse riding, dog walking, bird watching, and sunbathing. Holkham House, park and estate are in the adjacent NCAs but visitors to the house (22,019 in 2003), estate (200,000 in 2003) also access the beach and Holkham NNR in the NCA. Wells-next-the-Sea provides a traditional, beach oriented visitor experience, has a blue beech award and is a services centre for people not necessarily staying there. **Continued on next page...**		There are increasing noise and disturbance from some recreational activities for example aircraft and jet-skis, and increased litter, with conflicts arising between different recreational activities. Provisions for improving public access to and along the coast will be possible in future through the England Coastal Path. In order to become a sustainable tourism destination, the behaviour and impact of visitors, both positive and negative, needs to be fully understood and reflected in visitor management plans and policies. The Coasthopper bus, which runs along the A149 and links to the mainline rail services, has become a vital transport link for locals without access to car particularly older residents, walkers and visitors. It is one of the most successful recreational routes in England but is under threat as it is not financially sustainable without grant support.	Explore opportunities for sustainable tourism initiatives that increase visitors' environmental awareness and increase profitability and environmental credentials of local businesses, while protecting the special qualities of the area. Maintain the Coasthopper bus service, which provides a crucial service in the NCA, to help reduce car use. Plan for and manage potential increases in visitor numbers realising the potential of the coastal access path.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation cont		**... continued from previous page** All of the nature reserves are sensitive sites but Holme, Holkham and Blakeney are categorised in the AONB Visitor Management Plan as being the most fragile sites and under considerable visitor pressure from current levels of use and should not be promoted and car parking should be reduced. There are common rights for bait digging, samphire harvesting and wildfowling. The NCA is a prime area for walking and very popular with ornithologists, most of whom arrive by car which increases exponentially with the arrival of a rare bird. The Norfolk Coast Cycleway (Sustrans Regional Route 30) runs through some of the NCA. The social demographic of this area is significantly skewed to an ageing population and there are some disabled access routes.				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Coastal habitats Marine habitats Drained coastal marshes Fresh water availability Geology and geomorphology Low rainfall Reed beds	The whole coast is richly diverse with fauna and ornithological interest. The geographical position of the coast and its range of habitats make it especially valuable for migratory birds and wintering waterfowl. The salt marsh, mature dune and shingle bank flora is exceptionally diverse and the shallow coastal water has abundant invertebrate fauna. Maritime pasture provides a breeding habitat for waders and sugar beet tops and winter cereals provide a valuable feeding area for wintering wildfowl.	International	The area's important habitats are vulnerable to the direct impacts of climate change particularly from sea level rise. Evidence from the Wash and North Norfolk Coast European Marine site suggest that certain recreational activities are having an adverse effect on the most fragile habitats and species causing disturbance to wildlife and seals, and damage to salt marsh. Decline in some key bird species in the North Norfolk Coast Special Protection Area (SPA) may be linked to recreation pressures. There are also impacts on ground-nesting, feeding and roosting birds, particularly little terns and ringed plovers that are vulnerable to disturbance from dogs, light aircraft users or beach users. **Continued on next page...**	Promote the reversion of arable land back to coastal wetland where appropriate. Seek to maintain and improve structure and stability of salt marsh and ensure that there is appropriate grazing for robust cover of vegetation. Restore dune slacks at Holkham and Holme to ensure that there is a succession of dune slacks at different stages of re-colonisation to provide a habitat for natterjack toads and other dune slack species. Explore in partnership the possibility of Consider introducing a voluntary visitor contribution scheme that raises awareness of the link between the high quality landscape of the NCA and the pressures presented by visitors, and enabling visitors and locals to contribute directly towards the conservation and enhancement of the landscape.	**Biodiversity** **Tranquillity** **Recreation** **Sense of place / inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity cont				**...continued from previous page** The intent of the Shoreline Management Plan 2 policy is to allow the coastline to develop naturally while defending the integrity of settlements, the navigability of channels to a number of harbours and the A149 coast road. There may be losses and gains of designated habitat as a result. There are extensive reedbeds that are managed and provide a habitat which are favoured by rare breeding birds. There are potential conflicts between National Nature Reserve ecological status and visitors, and consequently the carrying capacity of this landscape in relation to its ecological and visual importance and sensitivity needs to be carefully considered. A choice may need to be made to sacrifice one or the other in any further development proposals. The landscape is highly sensitive and has reached a critical point in its development. [16]	Consider creating habitats inland to reduce the effect of rising sea levels, and identify larger areas for rollback.	

[16] Assessment from North Norfolk Planning Department (URL: http://consult.north-norfolk.gov.uk/portal/planning/lca/draft_landscape_character_assessment?pointId=1214817221150#section-1214817221150)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Striking landform that clearly reveals geomorphological processes which form an integral part of the coastal system. Eroding cliffs, mobile and fixed sand dunes, salt marshes with their associated shingle structures creeks, saltpans and marsh statigraphy and stony banks. Peat beds	The NCA has renowned geological sites at Blakeney Point and Scolt Head Island, an embryonic shifting dune system, white dunes, grey dunes and humid dune slacks, sandbanks, mudflats and sand flats and the large shallow inlets and bays presence along the coast. Weybourne Cliffs has exposures showing the early Pleistocene deposits of the Weybourne Crag Formation. Holocene peat beds are exposed at the western end of the coast due to coastal erosion. A relict cliff line at Morston displays interglacial raised beach deposits.	International	The Norfolk coastline is naturally dynamic, subject to continuous and often rapid change, which is a major part of its special character with a constant dynamic interplay of forces and processes creating tidal and intertidal salt marsh and reedbeds. The marine 'crags' have yielded both large and small mammal remains, of Pastonian and pre-Pastonian age, and there is potential for future vertebrate finds, but little has been published on these important fossils. The salt marsh has been described as some of the finest coastal marsh in Great Britain and the morphology and saltpans are the best documented and researched in the world. The peat beds at Holme, Thornham and Brancaster are fragile and easily damaged by beach users. The Morston raised beach provides evidence of fluctuating relative land and sea levels during the later Pleistocene.	Conserve integrity of active and relict landforms through development planning constraints and positive conservation management. Continue to research, monitor and record geomorphological processes to improve our understanding of them and to inform management decisions. Improve access and information about sites of geological and geomorphological interest and provide interpretation of the dynamic processes underway along the coast, to improve understanding and enjoyment. Educate recreational users about the Holocene peat and its historic importance to ensure it is not damaged. Consider initiatives to avoid high human foot-fall on the dunes at Holme and Holkham NNR which may lead to dune erosion, especially in fore-dunes.	**Geodiversity** **Biodiversity**

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